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# BETTER FRUIT

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NUMBER 9

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U.S. DEPARTMENT OF AGRICULTURE

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## FEATURES IN THIS ISSUE:

Controlling Pear Scab  
Commercial Fertilizers  
The Currant and Gooseberry  
Pruning the Prune Tree  
Fruit Box Supply Serious



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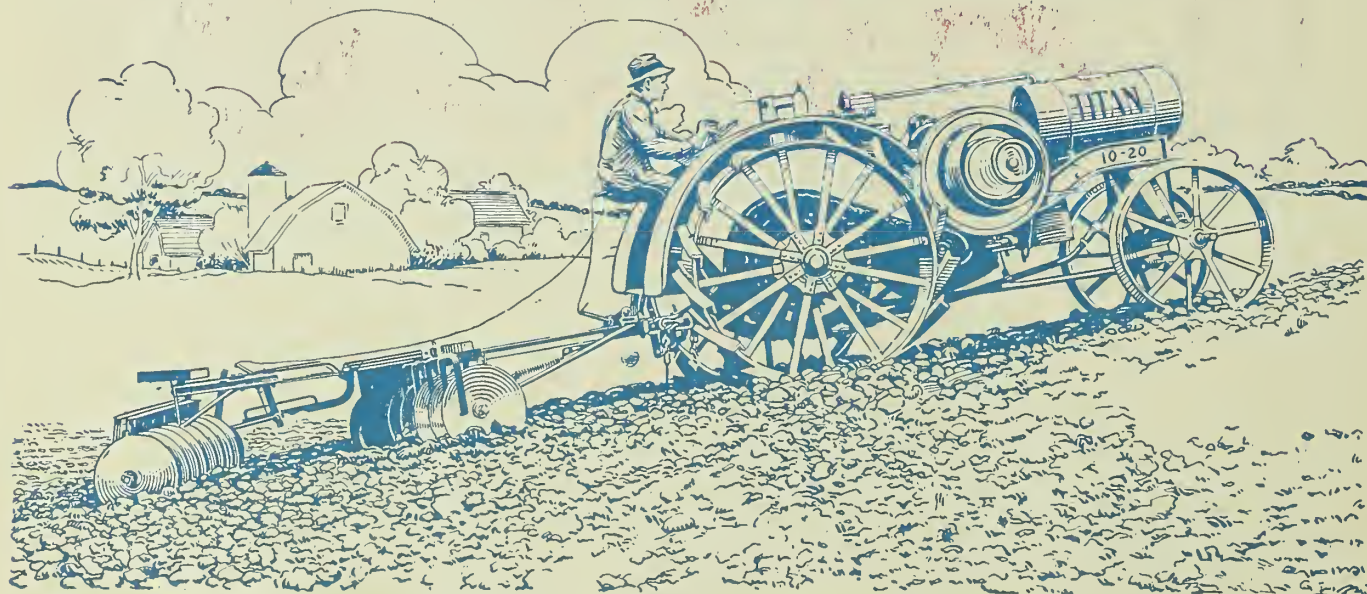
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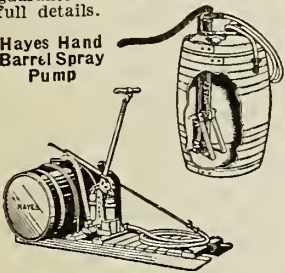


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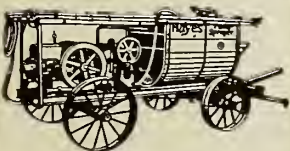
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## Controlling Pear Scab in the Pacific Northwest

By D. F. Fisher, Assistant Pathologist, Fruit Disease Investigations  
and E. J. Newcomer, Scientific Assistant, Deciduous Fruit Investigations, United States Department of Agriculture

[This article applies particularly to that part of the state of Washington west of the Cascade Mountains and to the Willamette Valley and the northwestern part of Oregon.]

THE culture of pears in that section of the Pacific Northwest located west of the Cascade Mountains has become an industry of rapidly increasing importance. In the Willamette Valley, Oregon, there is a large acreage of established commercial orchards, while a considerable planting of young orchards has been made both in this section and in the Puget Sound region of Western Washington, where older orchards are not so numerous. Pears thrive unusually well in these districts and have thus far not suffered from the pear blight scourge that has handicapped the culture of this fruit in other sections of the Pacific Northwest. Pear growing in these districts has also been greatly stimulated by the development of canning factories, which provide a ready outlet for a considerable portion of the crop.

The industry has, however, suffered severe loss and its development has been greatly handicapped by various insect pests, as well as by the prevalence of pear scab, a fungous disease. While spring and summer spraying of pears for the control of scab has been quite generally practiced, the results have often been disappointing, especially when spraying has not included an insecticide for the control of insects which cause a disfigurement that appears very much like scab spots when the pears are mature. It is the aim of this article to present to the orchardist information which will enable him to recognize and distinguish these troubles and to take the necessary measures for their control.

### Pear Scab

Scab is the only fungous disease of importance occurring on pears in the region covered by this article.

Next to pear blight, scab is the most serious disease to which the pear is subject. While it is readily controlled by sprays it annually causes a heavy loss because of inattention to spraying, inefficient spraying materials, careless methods of application, or failure to spray

at the right time. The crop yield is frequently cut from 50 to 75 per cent, and unsprayed fruit is usually so unsightly that it is practically worthless for marketing. If greatly deformed it can not be disposed of even through the canneries.

Influence of Climatic Conditions—The economic importance of the disease varies greatly with the climatic condi-



FIGURE 1—Scab on a mature Bartlett pear from infection occurring early in the season.

tions. Where the climate is strictly arid and where pear growing is entirely dependent upon irrigation, scab is not found; but where humid conditions prevail and natural rainfall is depended upon for soil moisture, scab must be contended with. Thus, in the Pacific Northwest scab is entirely absent from the hot interior irrigated districts east of the Cascades, such as the Yakima and Wenatchee Valleys, where pear culture has been developed into an extensive industry, while west of the

Cascades every pear tree is subject to the attack. The natural limitation of the disease is due to moisture conditions.

Scab infection requires moisture on the surface of the susceptible parts, such as leaves, blossoms and fruit. Moreover, it requires the surface to be wet for about two days; mere dews or fogs followed by drying weather will not suffice, for although the spores may germinate, the subsequent drying kills the fungus before it has an opportunity to establish itself in the plant tissues. Frequent rains followed by muggy weather which does not permit the trees to dry create the most favorable condition for scab growth. This being true, it is to be expected that the severity of the disease will vary from year to year in accordance with the precipitation and that it will become more serious in seasons of prolonged rainfall, but be restricted during periods of drought.

The climate of Western Washington and Northwestern Oregon is peculiar in that the winters are very mild, with little snowfall but considerable rain. The spring is usually rainy, with some precipitation or fog during part of nearly every day. The summer, however, is prevailingly without rainy periods, with bright clear weather most of the time. With the coming of fall, however, rains begin again. Under such climatic conditions the greatest injury from pear scab occurs early in the spring, but late attacks of the fungus often occur on fruit that does not mature before the fall rains. The early infection of the fruit results in the greatest disfigurement (Figure 1), as well as often preventing a crop from setting; consequently, it causes more loss than later attacks. During the summer season scab infection is less likely to occur and is entirely dependent on chance periods of rainy weather.

Character of the Injury—Pear scab is a fungous disease that attacks the fruit, foliage, and twigs. The greatest damage is done to the fruit, on which it produces the sooty appearing spots so familiar to most orchardists. These spots are generally somewhat irregularly circular in outline, with a velvetlike ap-



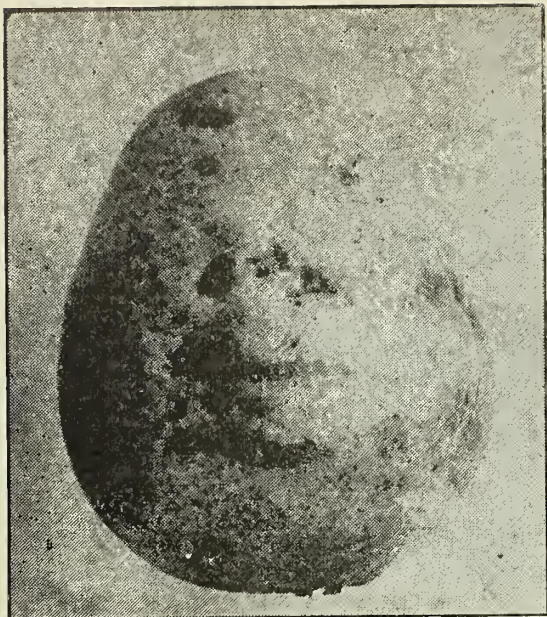


FIGURE 2—Late infection of scab on a Bartlett pear and injury caused by the syneta leaf beetle. The elongated spots were produced by the beetle.

pearance, black or olive green in color. In size the spots range from mere specks to areas that may cover the entire side of a young pear, while two or more spots may coalesce and increase the extent of the affected area. When very young pears are affected they may drop before they become one-half inch in diameter. The fungus causing the disease grows just beneath the cuticle, which becomes ruptured, exposing the epidermis, which is rendered corky on exposure, thus forming a roughened spot. Its effect is strictly local at first and causes no discoloration or hardening of the flesh beneath; but as the pear grows the scab injury restricts the expansion of the fruit and causes it to become distorted in shape, a most objectionable feature. If the normal growth of the fruit is greatly distorted, cracks may be formed which extend halfway around the pear and almost to the core.

The infection of buds and blossoms on unsprayed trees is frequently severe and often results in a great reduction of the crop. Scab on the buds and blossoms is exhibited as dark, velvety, and sooty-appearing spots, much the same as on the young fruits, and infection may occur on any of the more exposed flower parts. Infection of the flower stalk is almost certain to prevent the fruit from setting.

Foliage infection frequently is not recognized by the orchardist, but it is one of the most serious manifestations of the disease. Infection occurs chiefly on the under side of the leaves and is exhibited as a dark olivaceous colored spot, similar to scab on the fruit. When many infections occur on a leaf it may become somewhat curled and deformed, and frequently it drops prematurely. If the defoliation is severe the tree is unable to function normally and can not store up the food requisite for the production of fruit buds and the maintenance of its own vitality; hence, the succeeding crop may be greatly affected. Foliage infection is also important as a means of carrying over the disease from year to year.

On tender twig growth scab first appears in the characteristic sooty spots, but persists over winter and eventually causes the bark to become ruptured, so that after a year or two the younger branches seem to be covered with small irregularly circular shaped and blister-like cankers. As the branch grows older these roughened areas slough off and healthy bark is formed over the injury. Twig infection is not as prevalent as the other types, but is likely to be found in neglected orchards. It is important chiefly as a source of infection for fruit and foliage.

**The Fungus Causing the Disease—**The fungus causing the disease is closely related to the well known apple scab fungus, but it is a different species. It persists over winter not only on the

able. These "summer spores" thus rapidly reproduced serve as a constant source of infection throughout the season, and the fungus becomes established. Spores matured on the twig cankers cause infection in the same manner or may be washed on to the fruit and foliage during rains.

The period of greatest infection is from the time the first buds appear until about a month after blossoming, or until summer weather is encountered. The cool, wet weather which usually prevails during this period constitutes the most favorable climatic condition for the growth and dissemination of the fungus, while the new pear growth is very tender, permitting scab infection to be easily established. Hot, dry weather is very unfavorable to scab and it does not thrive after the period of spring rains, but if a period of wet weather is encountered later in the season new infections will be formed. If infection occurs when the fruit is about mature, small scab spots are produced, but no distortion occurs. (Figure 2.) Frequently at this time the fungous growth occurs around the margins of earlier scab spots, so that these roughened areas are often seen surrounded by a fresh ring of dark velvety scab growth.

**Treatment—**In the treatment of pear scab it is important to dispose of all possible sources of infection, and to this end twig cankers, if present, should be removed in pruning and the infected wood burned. Some disposition should also be made of fallen leaves, which harbor the fungus over winter and which are the most important source of early spring infection. It is impracticable to rake and burn them, and

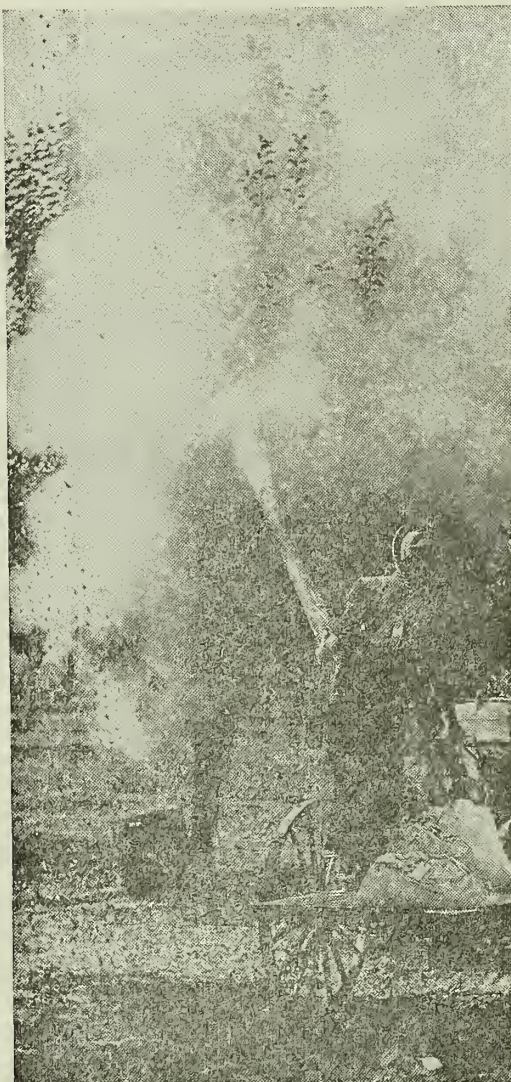


FIGURE 3—Power dusting machine in operation showing how the trees should be covered with dust.

twigs but also on the fallen leaves. Infected leaves remaining on the ground over winter permit the fungus to complete a stage in its life history. In the spring, at about the time the buds on the pear trees are breaking, "winter spores" are matured from the old scab spots on the fallen leaves. These spores are wafted about by the wind and lodge on the tender buds and foliage, and if the moisture which is necessary for their germination is present infection proceeds and a new scab spot is formed. This new scab spot produces "summer spores" with great rapidity, mature spores being formed within two weeks if weather conditions are favor-

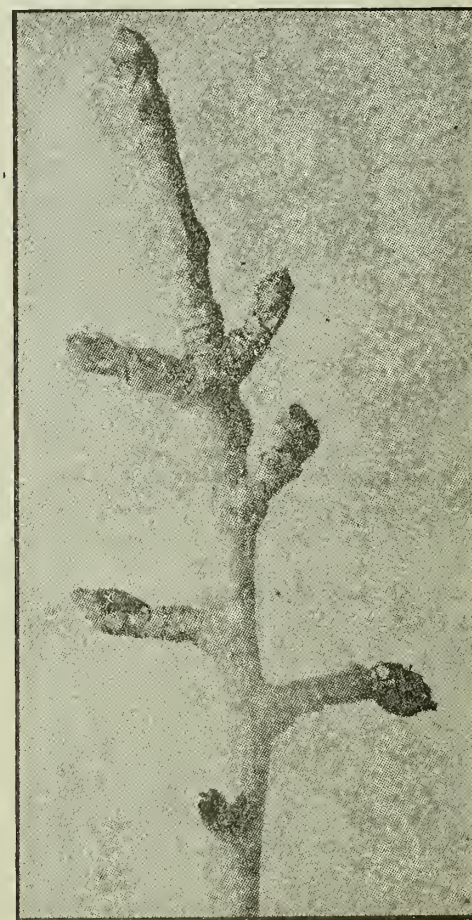


FIGURE 4—A Bartlett pear twig, showing the condition of the buds at the time when the first scab spray or "delayed dormant" spray should be applied.



because of their fertilizing value it is not desirable, but early plowing should be practiced and the leaves all turned under before the buds break and expose the flower parts. Such sanitary measures are valuable in connection with subsequent spraying during the summer season, but in themselves are incapable of controlling the disease.

In spraying for pear scab as well as for other fungous diseases the fundamental point to be considered is that spraying is preventive and not curative in nature; that is, after infection has taken place and the fungus has established its growth in the host, it can not usually be eliminated by spraying. To be most effective the fungicides must be applied before infection takes place; the spray coating must be present before the spores reach the parts that may be infected. The action of such sprays is to inhibit the germination of the spores or to destroy the fungus before it can penetrate the cuticle.

To combat pear scab successfully requires, first of all, efficient fungicides as spray materials; second, thorough spraying, so as to cover all growing parts; and, third, properly timed applications to cover the requirements of the locality and the season. Bearing in mind the fact that scab infection must be anticipated and that the period of greatest infection is from the time the buds appear until about four weeks after blossoming, it is apparent that during this period the trees should be covered at all times with a protective spray coating. But since scab development

is dependent upon moisture conditions it is evident that the number of sprayings must vary with the season.

Among the most efficient fungicides against pear scab are two materials quite universally used, lime-sulphur solution and bordeaux mixture. Both may be purchased in convenient form on the market, but often may be more economically prepared at home. The former sometimes causes foliage injury, but at a dilution of 1 to 40 it is quite safe to use on pears. Bordeaux mixture is a somewhat stronger fungicide, but it frequently causes an objectionable russetting when applied to tender young fruits and is in less favor on this account. It is, however, very efficient in controlling pear scab. Sulphur, very finely divided, in the form of an impalpable powder and applied with a dusting machine (Figure 3), is also an efficient fungicide against pear scab, being much more satisfactory in this respect than the commercial bordeaux dusts that are now on the market.

These general statements concerning spray materials, as well as those which follow in regard to their application, are based upon a series of experimental tests carried out by the Office of Fruit Disease Investigations of the Bureau of Plant Industry during the seasons of 1915 to 1918, inclusive, at Vancouver, Clarke County, Washington, and at Salem, Marion County, Oregon. The results agree, however, rather closely with those previously obtained, and with well-established usage, in the humid Northeastern United States, especially in the Great Lakes region, where pear scab is very severe.

When to Spray for Pear Scab—Make the first application for pear scab before the cluster buds begin to separate (Figure 4), and about the time that the first white is seen in the flower buds, using a strong bordeaux mixture (4-4-50 is satisfactory) or lime-sulphur solution (testing 32° Baumé) diluted 1 to 20. This application is important in those orchards whose immediate past history reveals serious scab infection, especially if early plowing has not been resorted to to dispose of infected leaves on the ground or if twig cankers remain plentiful on the trees. This application is frequently very valuable when the weather continues rainy and when the fungus may obtain a foothold on the exposed leaves before the time for the next spraying. As the disease is brought under control and the orchard is maintained free from infection, it probably will be found that this application may be eliminated. A practice that has met with favor with some orchardists is to delay the application of dormant strength lime-sulphur solution (1 to 8) until this time, making what is known as a "delayed dormant" application. However, this procedure involves considerable danger of injury to advanced fruit buds, and can not be considered a safe practice, especially if the buds are pushing out rapidly. If the blister mite is present the "delayed dormant" spray is too late for the best results against this pest, and the strong lime-sulphur should be applied at the



FIGURE 6—Bartlett pears, showing the condition of the fruit at the time when the third spray or calyx spray should be applied.

time it will be most beneficial against the blister mite, a separate fungicidal application being made for scab.

The second application (corresponding to the "pink" spray in the case of apples) should be made as soon as the buds are separated and showing white, which will be just before blossoming (Figure 5). Either bordeaux mixture (4-4-50) or lime-sulphur solution diluted 1½ to 50 should be used. At this time all of the outer flower parts are exposed and may be protected by spraying. The period for most effective spraying does not usually exceed three or four days. This is probably the most important single application, especially in a wet season, and should not under any circumstances be neglected, since infection of the flower stalks at this time is almost certain to cause the fruit to drop.

The third application, known as the "calyx spray," is also highly important and should be made as soon as the petals fall (Figure 6), using lime-sulphur diluted 1 to 40 instead of 1½ to 50. In practice it is best to begin spraying before the petals are all off, if a large acreage is to be covered, since the period for most efficient spraying sometimes does not exceed two or three days after the blossoms fall, depending on the weather conditions. By this time the young pears are fully exposed and must be protected. Infection at this time causes a serious stunting and distortion in the growth of the fruit. For the control of the syneta leaf beetle lead arsenate should be added to the fungi-

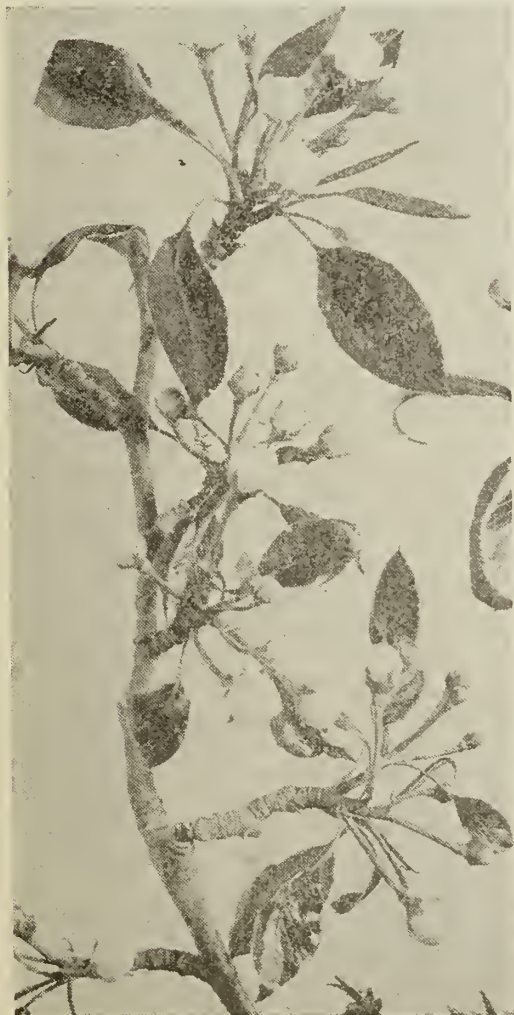


FIGURE 5—A Bartlett pear twig showing the condition of the buds at the time when the second scab spray or the "pink" spray should be applied.



cide. Lead arsenate is valuable not only as an insecticide but in increasing the effectiveness of the fungicide.

A fourth application, in which the same fungicide is used and at the same strength as in the preceding application, should usually follow the "calyx spray" within ten days or two weeks, in order that the protection of the rapidly growing fruit may be continued. In a dry spring, however, this application is less important and may be omitted. Lead arsenate should again be added to the fungicide, to control chewing insects.

The last spray which is generally required should be applied about a month after the "calyx spray." Either lime-sulphur solution, diluted 1 to 40, or bordeaux mixture (3-3-50) may be used, but the latter is recommended for this application because of the tendency of sulphur sprays to cause injury to fruit and foliage when used during hot weather and intense sunlight. For summer pears, such as the Bartlett, no later spraying ordinarily is necessary in this region, but in the case of varieties that are not picked until after the fall rains begin it is essential to spray again before the rainy period is expected.

By systematically following the spraying schedule here described and concisely outlined in the table it has been possible to reduce the loss from pear scab to an amount almost negligible from a commercial standpoint as seen in Figure 7.

**Insect Pests**

There are several insects which cause a great deal of damage to pears in Western Washington and Oregon. The methods of controlling these insects vary, and it is therefore essential that the orchardist know what insect is damaging his trees or fruit before attempting to remedy the trouble. Otherwise he may be spending his time and trouble for nothing.

The table given with this article summarizes the control measures recom-

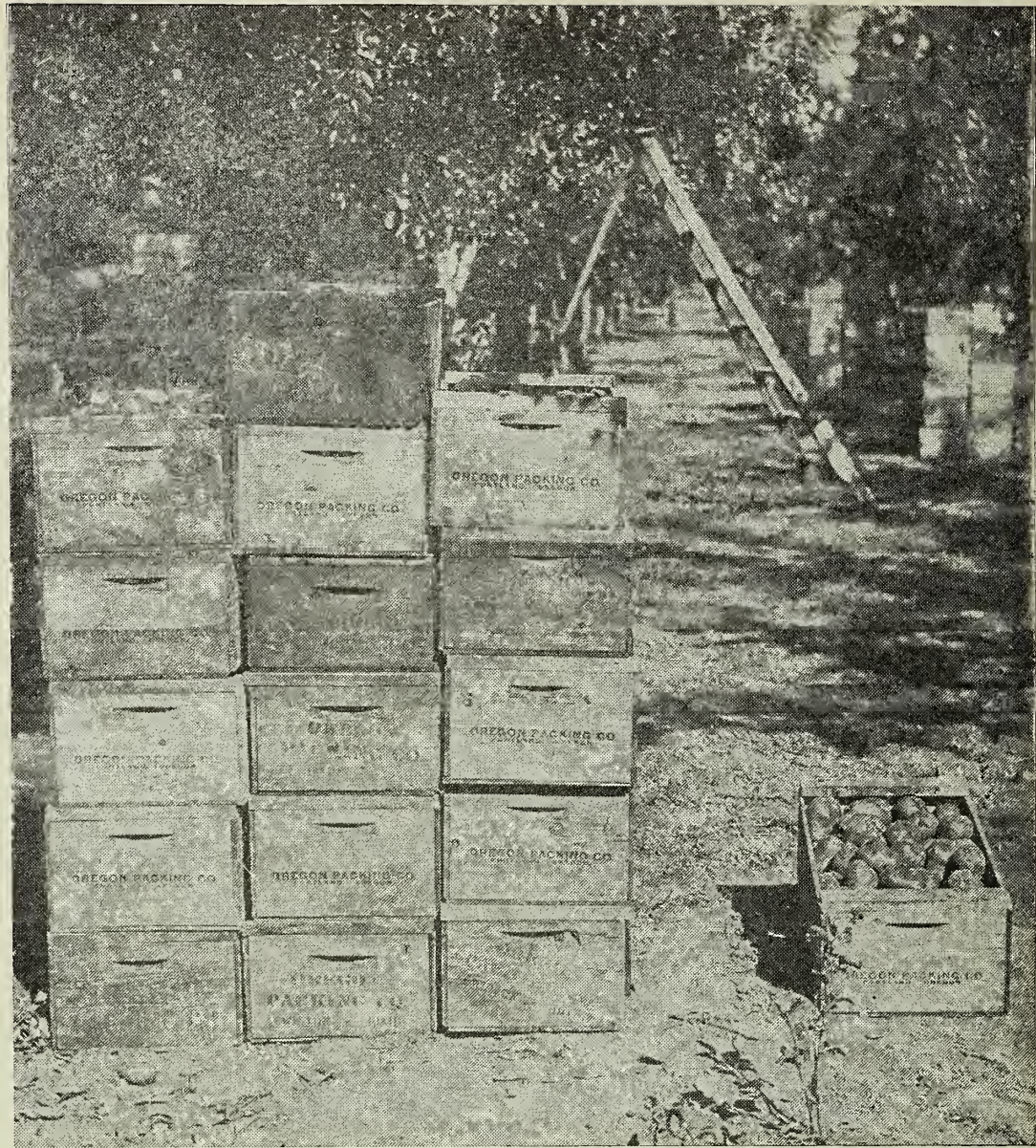


FIGURE 7—Sixteen boxes of clean pears and one box of scabby and injured pears from three sprayed trees. The injuries from scab and the syneta leaf beetle in the box shown were almost negligible from a commercial standpoint, the fruit suffering no discount at the cannery. In contrast to this, three unsprayed trees yielded nine boxes of clean pears and six boxes of scabby and injured pears. The injured fruit on the unsprayed trees was so bad that it was discounted one-third at the cannery.

mended for pear scab and insects for the coast regions of Washington and Oregon and shows when and with what materials to spray.

Since it is not always necessary to apply all of the five scab sprays or to

spray for all the insect pests mentioned, a distinction has been made in the table between the more important and the less important applications. The more important applications are printed in heavy type, namely, the dormant spray, the second scab spray, the third scab spray, and the fifth scab spray. The materials to be used and the pests controlled by these sprays are also indicated by heavy type. Under most conditions these four sprays should be applied to insure maximum returns from the trees, and it is believed that a consistent spraying program involving the use of these four applications will suffice in most cases. In orchards that have been neglected or carelessly sprayed it will be necessary to include the first scab spray until the disease is brought under better control, and in a wet season the fourth scab spray should also be included. The various insects whose names appear in light type are more numerous in some seasons than in others or occur more commonly in some localities than others. Hence local and seasonal conditions will have to determine whether or not they should be sprayed for.

SPRAYING SCHEDULE FOR PEARS IN WESTERN WASHINGTON AND OREGON.

Application and Time	Materials	Pest Controlled
<b>Dormant spray.</b> Apply when tree is dormant, preferably in spring.	<b>Lime-sulphur, 32° Baumé, 1 to 8....</b>	<b>San Jose scale and pear leaf blister mite.</b>
<b>First scab spray (delayed dormant).</b> Apply when buds are bursting (Figure 5).	<b>Lime-sulphur, 32° Baumé, 1 to 20, or Bordeaux mixture, 4-4-50.</b> <b>Lead arsenate, powder, 1 pound, or paste, 2 pounds, to 50 gallons of spray.</b>	<b>Pear scab.</b> <b>Bud moth.</b>
<b>Second scab spray (pink spray).</b> Apply when blossom buds are well separated (Figure 6).	<b>Lime-sulphur, 32° Baumé, 1½ or 2 to 50, or Bordeaux mixture, 4-4-50.</b> <b>Lead arsenate, powder, 1 pound, or paste, 2 pounds, to 50 gallons of spray.</b>	<b>Pear scab.</b> <b>Bud moth.</b>
<b>Third scab spray (calyx spray).</b> Apply as soon as most petals have fallen (Figure 7).	<b>Lime-sulphur, 32° Baumé, 1 to 40...</b> <b>Lead arsenate, powder, 1 pound, or paste, 2 pounds, to 50 gallons of spray.</b>	<b>Pear scab.</b> <b>Syneta leaf beetle and pear leaf worm.</b>
<b>Fourth scab spray (10-day spray).</b> Apply 10 days or two weeks after calyx spray.	<b>Lime-sulphur, 32° Baumé, 1 to 40...</b> <b>Lead arsenate, powder, 1 pounds, or paste, 2 pounds, to 50 gallons of spray.</b>	<b>Pear scab.</b> <b>Syneta leaf beetle and pear slug.</b>
<b>Fifth scab spray (30-day spray).</b> Apply 30 days after calyx spray.	<b>Bordeaux mixture, 3-3-5, or Lime-sulphur, 32° Baumé, 1 to 40.</b> <b>Lead arsenate, powder, 1 pound, or paste, 2 pounds, to 50 gallons of spray.</b>	<b>Pear scab.</b> <b>Pear slug.</b>



# Commercial Fertilizers for the Orchard and Garden

W. S. Thornber, Consulting Horticulturist

**T**HE increased cost of orchard and garden operations during the past four years and the world-wide demand for increased production of food compels fruit men and gardeners to avail themselves of every possible opportunity to increase crop production to the maximum without seriously increasing the amount of labor necessary to produce additional crops, and at the same time not materially increase the cost of production.

Orchard and garden operations that will require an unusual increase in labor cannot be favorably looked upon by farmer folk this year. Increased production by other means than by increasing the number of laborers for the small farm must be the solution of the problem.

One or both of the following methods can be used to advantage in solving the problem. One is the use of power machinery or larger teams and the other is the use of commercial fertilizers.

The use of tractors or larger teams in orchard work will reduce the man labor to the minimum and in some cases one man will be able to do the work ordinarily done by several men and thus will increased production be possible by means of better and more thorough soil tillage and more timely operations. This can be worked to advantage in many gardens and orchards in the Pacific Northwest and especially in some of the larger orchards where cultivation has never been brought up to the highest possible practical degree. However, the greatest opportunity for increasing production at a minimum increase in cost and labor for the gardener and fruit grower lies in the use of commercial fertilizers.

The fruit growers and farmers of the West have long depended upon the plant food nature so abundantly gave them and entirely too many have failed to recognize the unmistakable signs of depleting soils and unprofitable crops.

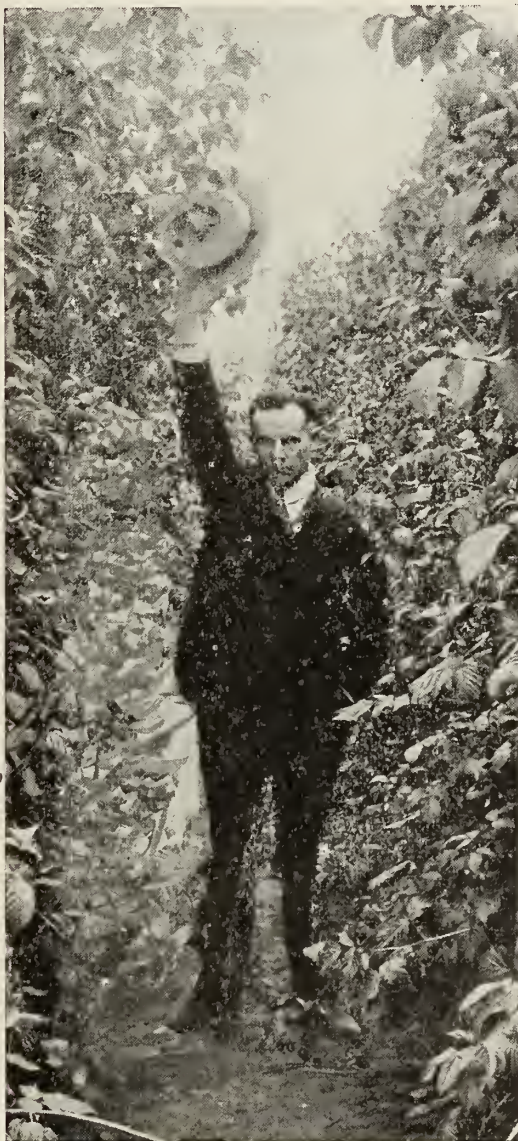
Clean cultivation and dust mulches while excellent for the conservation of moisture plays havoc with humus and plant foods.

An average sized crop of fruit is more injurious to the soil than an average crop of wheat, in that while it does not necessarily take out more plant food, it leaves the soil exposed to the burning action of the sun during a long period of the season.

A few years ago our college specialists told us that there was enough plant food of certain kinds to produce bumper crops for the next century or two but that certain other plant foods must be fostered and conserved in every possible way or it would be impossible for us to maintain our present high standard of yields. Fortunately or otherwise this condition has already appeared in a large number of the older orchards of the Northwest and the problem is now how can it best be met at the present time without serious loss of crops or large financial expenditures.

The results of successful fruit growers in different parts of the Northwest point to one of three methods for at least temporary if not permanent solution.

Where large quantities of barnyard manure can be secured at a reasonable cost it can be used to advantage, in the long run; however, very few growers will be able to secure manure in sufficient quantities to replace the losses



View of raspberry patch at North Puyallup, Washington, on which was applied a commercial fertilizer containing nitrogen, phosphoric acid and potash in a concentrated form. The canes in this patch reached a height of eleven feet and the yield of berries was correspondingly heavy.

that have already taken place and furthermore the action of the manure will be too slow to be of immediate use for the coming crop. Eventually, if not at the present time, many fruit growers will find it economically advantageous to combine dairying or livestock projects with their fruit work.

In districts where there is an abundance of water for irrigation purposes nitrogen gathering crops can be used as cover and mulch crops in the orchard and the fertility of the soil be maintained at a small expense per acre. The action of these crops are very slow and not infrequently it is impossible to see results from their use before the

third or fourth year; nevertheless it is a good business proposition to make every possible use of these crops, even though it is necessary to supplement their actions with other more concentrated plant foods.

The use of commercial fertilizers is a new story to the Western fruit man. Nevertheless he will eventually adapt himself to their use just as he has to the spraying, pruning, cultivating, irrigating and thinning of fruit and in a comparatively short time the use of commercial fertilizers will be as common here as in other intensive agricultural sections. The fruit growers and gardeners long ago demonstrated their ability to adapt themselves to new and local conditions and chose methods, sprays, improved machinery and new varieties of fruit best fitted to their various localities, plans of management and marketing organizations, and when they realize the importance of keeping the chief elements of plant food in a balanced proportion in their soils in order to make it possible for the trees to produce profitable crops annually, large quantities of commercial fertilizers will be used.

Recent experiments and demonstrations prove beyond a doubt that it is just as important to provide a so-called balanced ration for the bearing fruit tree as it is for the dairy cow or the laying hen.

Undoubtedly many a fruit grower has seen his trees produce an abundance of water sprouts and wood growth for two or three years following a very heavy application of a rich nitrogenous coat of manure and possibly during the fourth and fifth years harvested good crops of fruit but failed to realize that his orchard so to speak has been out of balance. In other words the food provided had resulted in wood growth at the expense of fruit production and the trees had done the most natural thing in plant life and that is to produce wood when wood producing plant food was in excess of the food for a reasonable wood production and a crop of fruit. On the other hand, had these trees been supplied with a so-called balanced ration, profitable annual crops would have been the outcome, unless affected by late spring frosts or other unfavorable weather conditions.

It is also interesting to note that the fruit buds and blossoms on trees fed on a properly balanced ration will withstand injury from several degrees more of frost than trees either overfed or underfed under similar conditions. The writer had the opportunity last year to carefully observe during the spring frost the behavior of several varieties under test and it was especially evident in all varieties that the properly fed trees came through with very little if any loss while other trees lost all or nearly all of their fruit.

Just what fertilizer to use and how to apply it is a problem that must be

Continued on page 39.



# The Currant and Gooseberry and How to Grow Them

By George M. Darrow, Office of Horticultural and Pomological Investigations, United States Department of Agriculture  
(With acknowledgment to others)

**B**OTH currants and gooseberries are natives of cool, moist northern climates and in the United States succeed best in the northern half of the country and east of the one hundredth meridian. They are injured by the long hot summers of the Southern States, except in the higher altitudes of the Appalachian Mountains. Even in Missouri and Kansas they do not succeed very well. They are not adapted to the hot interior valleys of California, but are grown in the northern coast counties of that state.

Gooseberries are grown slightly farther south than currants and seem to endure the summer heat somewhat bet-

danger of that disease being spread to valuable forest areas.

The fruit worms, especially the currant maggot, are very serious pests on currants and gooseberries in the mountain and Pacific Coast states and have made the production of these fruits difficult in many sections there. The currant maggot, for which there is no known means of control, occurs also in some localities in the Eastern states.

## Soil and Site for a Plantation.

The soil selected for the currant and the gooseberry should be cool, well drained, and fertile. The heavy types, such as silt or clay loams, are usually

rowing. Recently plowed sod land should not be used as a rule, because the sod will interfere with the setting of the plants and the management of the plantation until it becomes completely rotted. Sod land plowed early in the autumn and reseeded and harrowed the following spring will usually be in good condition for planting, as will land in a good state of fertility following a crop of potatoes, tomatoes, or some other hoed crop.

## Propagation of the Plants

Plants of the varieties desired generally can be secured from reliable nurserymen at small cost, and this is a satisfactory way to obtain them either for the home fruit garden or for commercial plantings. They may be propagated in the home garden, however, by means of layers or cuttings.

Gooseberries ordinarily are propagated by mound layers. The plant from which layers are to be procured should be cut back heavily before it begins to grow in the spring. By July it will have sent out numerous vigorous shoots. It should then be mounded with earth half way to the tips of the shoots. By autumn the shoots will have rooted. Those with strong roots may then be cut off and set in the nursery, to be grown for one or two years before planting in the field. If the roots are not well developed, it will be better to leave the shoots attached to the parent plant for a second year. They will make strong root systems meanwhile, and then, if grown for a year in the nursery, after being cut from the parent plant they will be satisfactory for planting. The latter method is more common in the case of European varieties, which do not root so readily as American sorts.

A few varieties of gooseberries are propagated more easily by cuttings than by layers. Those varieties which are of European parentage are generally the most difficult to propagate by cuttings. American sorts vary greatly in this respect, however. Thus, cuttings of the Houghton variety root readily, while those of the Downing do not. Two new and as yet little known varieties, the Poorman and the Van Fleet, are easily propagated by cuttings. If cuttings are used, they should be of the current season's growth and about eight inches long, and they should be handled in accordance with the directions given below for currant cuttings.

Currants are propagated almost entirely by means of cuttings made from vigorous shoots of the current season's growth. In the Eastern states cuttings are made about eight inches long and in the Pacific Coast regions from ten to twelve inches long. They are usually cut in the autumn after the leaves have dropped and may be set in the nursery row immediately, or buried in sand with the bottom end up, or stored until spring in a cellar cool enough to keep them dormant and moist enough to pre-



Branch of the Golden Prolific variety of currant, which is a native of Western Kansas and Oklahoma and Eastern Colorado. The fruit of this currant is golden in color, and like some of the black varieties, must be picked singly, as they do not ripen at the same time. Varieties of this species are very productive under proper soil and climatic conditions.

ter. More spraying, however, is necessary to keep the foliage of currants and gooseberries in a healthy condition in the southern part of their range than in the northern part.

Currants and gooseberries are very hardy and withstand extremely low temperatures; in fact, if windbreaks are provided, most varieties are able to withstand the severe conditions in most parts of the upper Mississippi Valley and the northern Great Plains area.

In the region west of the one hundredth meridian limited rainfall restricts their culture materially, except in irrigated sections and in comparatively small areas in Northern California, the Willamette Valley, and the Puget Sound region.

Four factors limit the growing of currants and gooseberries in the United States: The white-pine blister rust, the currant maggot, the lack of moisture, and the heat of summer.

The blister rust makes it necessary to eradicate currant and gooseberry plants already growing and to prevent new plantings wherever the white pine is an important forest tree and there is

better in these respects than sandy soils. Neither fruit will do well on land where water stands during any part of the year.

In regions toward the southern limit of their culture it is best to select a northern or northeastern slope, in order to give some protection from the sun. The north side of a building may be selected when only a few plants are to be grown for home use.

A place with good air drainage is preferred for gooseberries. In low, damp places mildew attacks both fruit and foliage more severely than on higher sites where the air circulation is better. Currants, however, are seldom severely attacked by mildew. Therefore, when the site is a sloping one, currants may be planted on the lower parts and gooseberries above. As both fruits blossom very early in the spring, neither should be planted in low pockets where late spring frosts may kill the flowers.

## Preparation of the Soil

Before planting the soil should be prepared as for garden crops. This includes deep plowing and thorough har-



vent drying, but not so moist as to cause mold to develop on them. The cuttings may also be made during the winter or in early spring. In the latter case they are put in the nursery at once. The cuttings should be set from three to six inches apart in the nursery row, with the soil firmly packed about them. This is done as early in the spring as the soil can be worked, whether the cuttings are made in the autumn or later. Not more than two buds should be left above the ground. At the end of one or two seasons they should make plants satisfactory for setting in the field. All the new wood is removed each year to make cuttings.

#### Time to Plant

In most sections plants may be set either in the autumn or spring, but in Northern Iowa and Nebraska and the states north of them only spring planting should be practiced. Both currants and gooseberries start growth very early in the spring, and if nursery stock can be secured in the autumn that season is preferred for planting except in the section just mentioned. In order that the roots may be thoroughly established in the soil before winter, the plants should be set as early as it is possible to obtain them in a dormant condition. Currants may be planted as early as the middle of September in the Northern states, except as noted above, and gooseberries as early as October 1. It is often difficult, however, to purchase plants for autumn setting.

#### Distance to Plant

The distance between the rows depends on the method of tillage. If a one-horse cultivator is to be used, the rows should be set six feet apart, while for a two-horse cultivator the rows should be eight feet apart.

The distance between the plants in the rows depends to a considerable extent on the variety. If the bushes are of a variety that does not grow large, they may be set as close as four feet, while if the bushes are naturally large when fully grown or the ground is very rich five or six feet apart is preferred. The bushes of the Wilder, London, and some other red currants and of all black currants grow larger than those of the Perfection, Fay, and Red Cross varieties and should be set farther apart in the row. Therefore, if in any section Red Cross bushes are commonly set five feet apart in the row the Wilder bushes should be at least six feet apart.

The Downing, Houghton, Oregon, and Poorman gooseberries have larger bushes than most others. They may be set four or five feet apart in soil of ordinary fertility, but in very fertile soil they will need to be six or seven feet apart. Gooseberry bushes of European parentage usually do not grow as large as those mentioned, which are believed to be at least partly of American ancestry, and it is rarely necessary to set them more than five feet apart.

#### Directions for Planting

Before planting, all broken roots should be cut off and the top cut back to stand about six inches above the

ground. If the plants have especially strong root systems the tops may be left ten to twelve inches high. The plants should be set somewhat deeper than they stood in the nursery. If they do not branch naturally near the surface of the ground, they should be set so deep that the lowest branch starts just below the surface of the soil. This will cause them to take the form of a bush instead of a small tree.

The soil must be packed firmly about the roots with the foot as the plants are set. Without such packing the roots may dry out and the plants die.

In friable soils, such as fine sandy loams, the hole for planting may be made by forcing a spade straight down and then pressing it forward. The roots are thrust into this hole, the spade withdrawn, and the soil firmed about them. Plants can be set very rapidly in this manner. In heavy soils holes may have to be dug with a spade before planting.

be used, and very little hand hoeing will be necessary. If they are set so that the cultivator can be run in one direction only and the rows are seven or eight feet apart, a horse hoe may be used. This is easily guided, and if used in connection with the cultivator will reduce the amount of hand labor very considerably.

A mulch of straw or wild hay is sometimes advised for currants and gooseberries. It conserves moisture, keeps down weeds, and takes the place of tillage. Mice are likely to multiply in mulched fields, however, and girdle the plants; in fact, the injury from this source is so often serious that growers rarely use a mulch.

#### Interplanting and Intercropping

Gooseberries and currants frequently are interplanted in orchards or vineyards.



A plant of the May Duke gooseberry grown in New York. This gooseberry, which has large dark red fruit, is recommended by the New York Agricultural Experiment Station as the best early gooseberry of European parentage.

The cost is then much greater than by the former method, but unless the holes are dug the clay may harden about the roots so that the plants will never grow well.

#### Tillage and Mulching

Tillage should begin soon after the plants have been set and should be continued at frequent intervals throughout the growing season or until a green-manure crop is planted. The tillage should be deeper the first year than later.

Both currants and gooseberries usually are shallow rooted, and care must be taken not to injure the roots in tillage. If a cultivator is run rather deep the first year the roots may be made to grow somewhat deeper than they otherwise would. The first spring cultivation should be deeper than later ones. Growers sometimes use a plow at this time.

If plants are set five or more feet apart each way a horse cultivator may

When interplanted in cherry orchards gooseberries and currants may be left for several years, according to the growth of the orchard and the size of the bushes; and in apple and pear orchards they may be left somewhat longer, though the ground occupied should be restricted to one or two rows of bushes through the center of the space between the tree rows. Otherwise, the bushes will be likely to interfere with the proper care of the trees. In vineyards the currants and gooseberries are often made a part of the permanent plantation, but while they are commonly productive when so grown, the grapes are likely to be rather unproductive.

In gardens where the available land is limited in extent, currants and gooseberries may well be planted among the tree fruits and left there permanently. The shade of the trees protects the fruits from sun scald, and the foliage is usually healthier in such locations



than when grown where it is freely exposed to the sun. The shade afforded by the fruit trees will be especially beneficial in southern sections, and the currants and gooseberries should be even more productive than if planted by themselves.

When currants and gooseberries are not grown in orchards they may be intercropped for the first two years; that is, vegetables may be grown between the plants in the rows and between the rows. Lettuce, early potatoes, early cabbage, and other early crops requiring intensive cultivation are especially desirable for this purpose. The thorough tillage required by the vegetables is also needed by the berry plants, and the intercrop will often pay for all expenses connected with the care of the plantation.

#### Maintenance of Fertility

Both the currant and the gooseberry respond well to the use of fertilizers, even when planted on fertile soils.

be applied safely to gooseberry plantations than to currants.

In many sections green manure or cover crops may be used to keep up the humus supply. The seed is sown or drilled in between the rows early enough to allow good growth before winter, and the crop is plowed under early the following spring. If this practice is followed, less stable manure or commercial fertilizer will be needed. The green manure crops should be those best adapted to local conditions. Preferably, however, they should consist of legumes or a combination of legumes and non-leguminous plants.

#### Pruning the Bushes

Currants and gooseberries naturally form bushes with many branches which start out near the surface of the ground. Too many branches are usually formed. Pruning in a new plantation consists in removing the superfluous ones. It is only rarely that the branches are headed back. The prun-

ing just enough one-year-old shoots to take their places. Pruning, therefore, in effect is a process of renewal.

In pruning varieties of spreading growth the outer and lower shoots generally should be removed, as these branches are likely to droop to the ground and the fruit borne on them be covered with dirt. Varieties of very erect growth, on the other hand, should be thinned by the removal of the central shoots.

Black currants bear well on one-year-old wood. In pruning them wood that has borne two years should be removed and new wood left to replace it. Most, if not all, black varieties have an erect habit of growth, and the bushes should be thinned by removing some of the central canes. From six to eight branches are usually left on each plant. Within certain limits the heavier the pruning the larger and better the fruit, yet care is necessary not to go to extremes.

The general principles of currant pruning apply also to gooseberries. The fruit is produced on one-year-old wood and one-year-old spurs of older wood. Pruning consists in removing branches after they have borne fruit for two years and allowing new shoots to replace them. On the Pacific Coast, however, the practice is to allow a branch to fruit for three years before removing it. It is said in that region that the canes are most productive the third year, after which they should be removed. If the side shoots become too numerous, enough of them should be cut out to form a fairly open head. Branches which have borne heavily tend to droop, and these, as well as all other drooping branches, should be removed.

Plantations of gooseberries trained to the tree form, where all the branches start from a main stem at a height of one or two feet above the ground, have been comparatively unproductive in the United States. As the bush form, where all the branches start from the root at or just below the surface of the ground, is more productive, and as the gooseberry naturally grows in that form, it is the only one discussed here.

#### Yields of Fruit

The currant as a rule bears abundant annual crops. Good plantations in full bearing should yield not less than 100 bushels per acre, annually. Yields of 300 bushels per acre are exceptional, but have been recorded. Good plantations of gooseberries of European parentage should yield at least 100 bushels per acre. Those of American or partly American parentage are generally more productive and yields of 300 bushels per acre are not unknown. European varieties, however, usually sell for much higher prices than American varieties.

Bushes in gardens usually receive more intensive cultivation than those in large plantations and therefore yield more as a rule. Currant bushes under garden conditions often yield from five to ten quarts each and gooseberries even more.

Continued on page 38.



A 32-quart crate of Perfection currants ready for market as packed in the East. A large, bright crimson, slightly subacid berry, with compact clusters, long stems easy to pick. This variety is considered the best for many parts of the Northwest.

Their use, however, is governed by the same principles that apply to other crops. The kinds and quantities of the different plant foods that can profitably be used depend on the physical condition of the soil and the plant foods already available in it. The needs in any particular case can be determined only by applying the different plant foods separately and in different combinations to different parts of the plantation and noting the results. Thus, while stable manure and wood ashes can be used in liberal quantities and will generally prove profitable, each grower must determine for himself the amounts that will give the best results on his soil. In like manner the kind and quantities of commercial fertilizer to be used must be determined.

In places where a supply is available, 10 to 20 tons of stable manure per acre each year may be found profitable, and some successful growers use even larger quantities. Many use hen manure. Larger quantities of this may

ing should be done during the dormant period. If not done following the dropping of the leaves in autumn, it is frequently delayed until spring, shortly before growth starts.

Red or white currant bushes which are one year old should have the weaker shoots removed, leaving six to eight strong shoots, according to the vigor of the bush. At the end of the next year four or five two-year-old shoots and three or four one-year-old shoots should be left, and at the end of the third year about three shoots each of three-year-old, two-year-old and one-year-old wood.

The red and white currants bear their fruit at the base of one-year-old wood and on spurs on older wood. They bear best on spurs on two-year-old and three-year-old wood. Pruning bearing bushes after they are more than three years of age consequently consists in removing all branches more than three years old and which have passed this heavy bearing period, leav-



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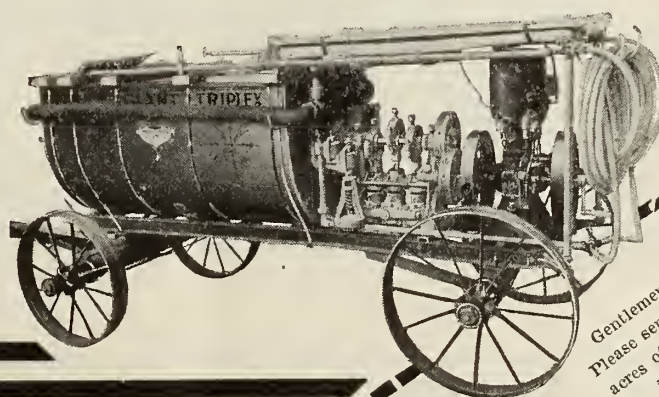
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# Setting, Pruning and Cultivating the Prune Tree

A Brief Summary On the Subject from Expert Sources

**I**N setting prune trees, severe pruning of the roots should be avoided and except where the roots have been mangled in removal from the nursery or in shipment it is not good practice to do much root trimming. As mangled roots are liable to engender the growth of fungus they should be removed. Great care, however, should be exercised in preserving the tap root from severe cutting.

In a recent bulletin on the subject of pruning young prune trees as well as apples, cherries, pears and European plums, Prof. Warren P. Tuffts, of the Agricultural Experiment Station of the

University of California at Berkeley, summarizes as follows:

1. The nursery tree should be cut at planting at a height of 20 to 24 inches above the ground.

2. The young trees should receive a coat of whitewash soon after planting to prevent sunburn on the trunk.

3. During April the orchard should be carefully pruned, the three main scaffold branches being selected and all undesirable growths pinched back.

4. At the first dormant pruning the trees should be thinned to the three main branches, properly placed, and

these limbs cut back so that they will be from 15 to 30 inches or more long.

5. During May of the second summer the trees are in the orchard, all unnecessary growth should be "thinned out." If the trees are making a vigorous growth, a "heading back" of the secondary scaffold branches, in addition to the thinning process may be given. Under favorable conditions, this practice will result in the securing of the usual second and third year's shaping during the second season.

6. With the exception of all varieties of the sweet cherry and of certain varieties of the other fruits of this group, the pruning out given during the second dormant season will consist of a thinning out only. "Heading back" one-year branches, under most conditions and in many varieties of apples, pears, European plums and prunes, will have a decided tendency towards forcing all new shoot growth to arise from near the pruning cuts. On the other hand, if these same branches are not cut back, the new shoots, except in certain varieties, will be well distributed up and down the previous year's growth. Notable exceptions to this rule are the Spitzenburg apple, Lincoln pear and the Pond plum, which follow the habit of the sweet cherry, in that new shoot growth arises from the tip of one-year wood whether this has or has not been headed.

7. The same pruning that is outlined for the end of the second growing season should be given during the third dormant season and until the trees come into bearing. Prunes and European plums may be expected to come into bearing somewhat sooner than apples and pears. The latter fruits in general, bearing sooner than cherries. The question of variety plays a most important role in determining the age at which a certain fruit may be expected to bear profitably. For example, the Wagener apple is noted for its precocious fruiting while the Northern Spy is notoriously slow in reaching productivity.

8. Trees in this group, as above designated, may be expected to reach a profitable bearing age during the fourth to eighth season and should thereafter be handled as full bearing trees.

9. All the above discussion presupposes good solid conditions and careful cultural treatment.

In writing on successful cultural methods for bearing prune trees Professor C. I. Lewis says:

"The man who is getting the best results, practices thorough tillage, tills early, keeps up the fertility of the ground and above all prunes annually. Unless a prune tree receives annual pruning, consistent, regular bearing cannot be expected. Unpruned trees will have many off years. Strong buds, blossoms which set well, and large

Continued on page 37.

## CONSULTING HORTICULTURIST

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*Formerly*

HEAD OF THE DEPARTMENT OF HORTICULTURE  
AND LANDSCAPE GARDENING

*Later*

DIRECTOR OF THE EXTENSION SERVICE  
OF THE  
STATE COLLEGE OF WASHINGTON

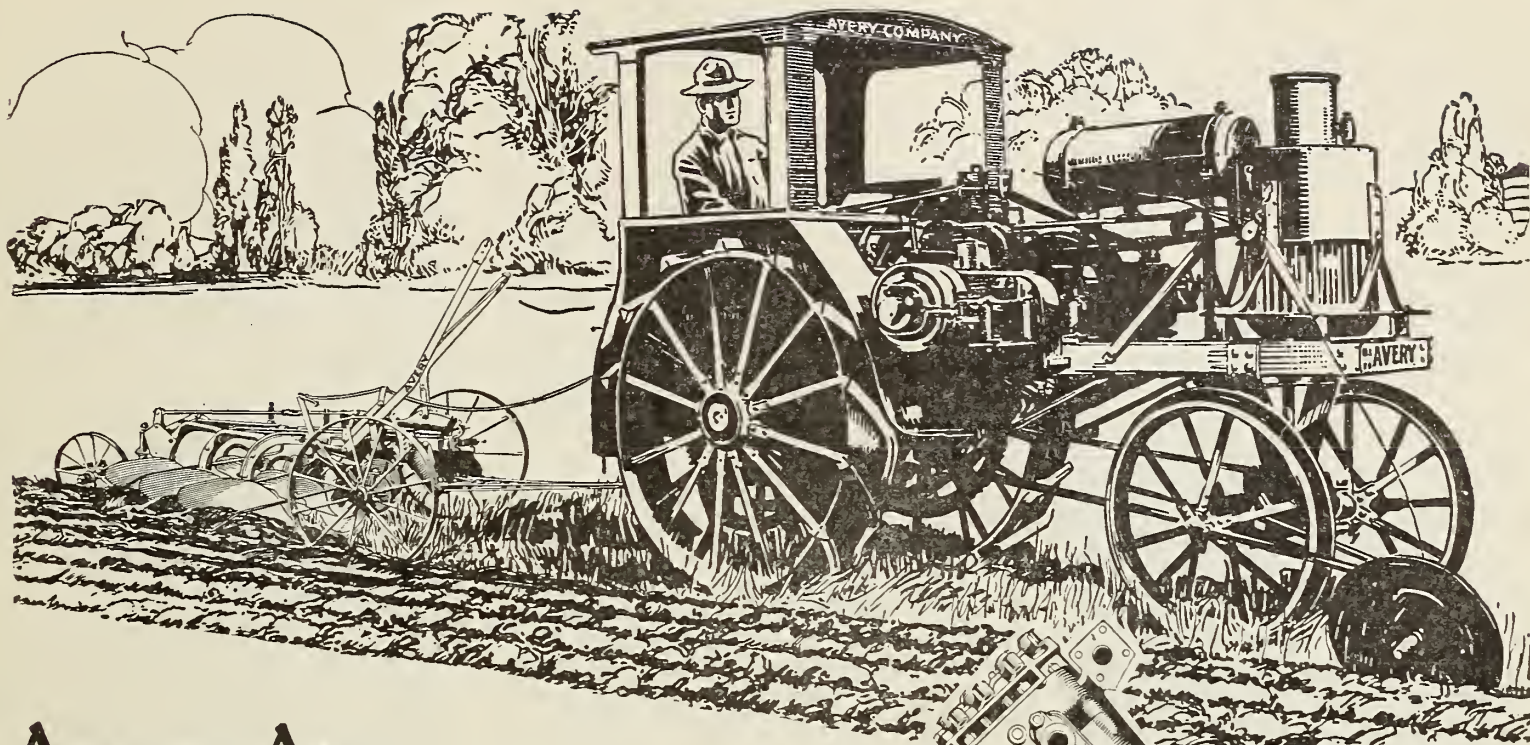
**W**ILL ADVISE with fruit-growers upon all horticultural problems, including selection and preparation of orchard lands; propagation and care of nursery stock; planting and care of young orchards and small fruit plantations; the control of codling moth, San Jose scale, blight and other orchard pests; the preparation of lime-sulphur at home and the mixing of other sprays; economical orchard management; the irrigation and fertilization of orchard lands; the use of cover-crops and grass mulches; the pruning of fruit trees, shade trees, shrubs, bushes and vines; the renovation of old or neglected orchards, top-working or replacing of poor or unprofitable trees, and the examining and the working out of practical management plans for large orchards and orchard companies.

If your orchard has not been a financial success, and you wish to determine its possibilities or you wish to improve your orchard, reduce your losses and increase your returns I will assist you in working out your problem.

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## Averys Are the Tractors with the "Draft-Horse" Motor and "Direct-Drive" Transmission

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It is a horizontal opposed motor improved and perfected with many exclusive Avery features. Its length distributes the weight properly between the front and rear wheels. Its narrow width makes possible a narrower tractor with less side draft. Also a short, heavy, practically unbreakable crankshaft—requires only two main bearings—always in perfect alignment—quickly adjustable with an ordinary socket wrench.

It is built with five-ring pistons, thermo-siphon cooling system, valves-in-the-head, renewable inner cylinder walls, and gasifiers that turn the kerosene or distillate into gas and *burn it all*.

Because of its low speed the power of the Avery "Draft-Horse" Motor is delivered through

### The Avery Patented Sliding Frame Transmission

giving "Direct-Drive" in high, low, reverse, or in the belt. The belt pulley is mounted right on the motor crankshaft. You get a larger percentage of the power developed by the Avery "Draft-Horse" Motor at the drawbar, and *all* the power in the belt.

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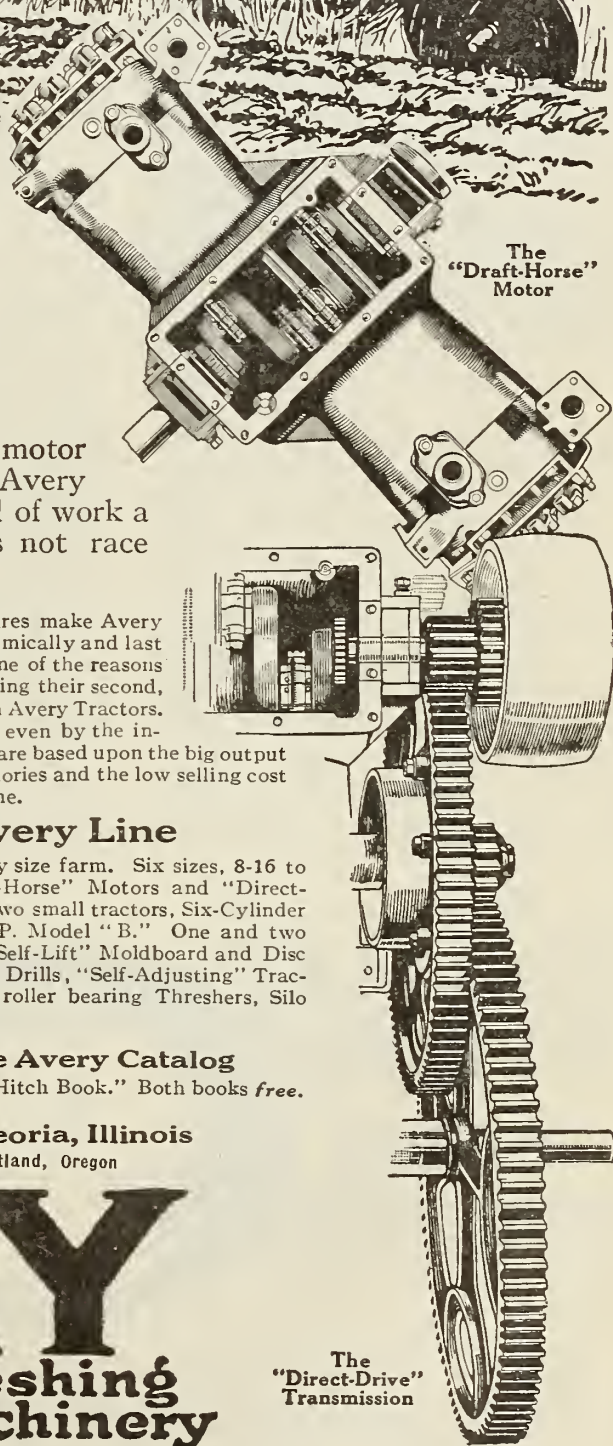
includes tractors for every size farm. Six sizes, 8-16 to 40-80 H. P., with "Draft-Horse" Motors and "Direct-Drive" Transmissions. Two small tractors, Six-Cylinder Model "C" and 5-10 H. P. Model "B." One and two row Motor Cultivators, "Self-Lift" Moldboard and Disc Plows, Listers and Grain Drills, "Self-Adjusting" Tractor Disc Harrows. Also roller bearing Threshers, Silo Fillers, etc.

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## Fruit Box Supply for 1920 Reported Serious

By Shad O. Krantz

ON account of the comparatively better prices for lumber, material that ordinarily goes into box shooks will be cut into other stock this year unless the fruit packers of the Northwest awaken to the situation that is confronting them and order their boxes early, was the statement made at the recent meeting of the West Coast Lumbermen's Association held in Portland.

Market conditions as influenced by demands of the fruit industry furnished the principal topic of discussion at the meeting. The proposal to change specifications on certain standard boxes so as to permit the use of two-piece ends was presented and while the meeting went on record as favoring the manufacture of cannery cases and fruit boxes with one or two piece ends and sides and two or three piece tops and bottoms, it did not make any definite agreement as to the exact style of box that would be manufactured. It is expected that this question will be brought before the association at some future date for final determination.

As temporary chairman George M. Cornwall, editor of the *Timberman*, pointed out to the box manufacturers their responsibility in helping to maintain the growth of the fruit industry on the Pacific Coast by providing sufficient box material, while E. E. Young, of the California Peach Growers' Supply Company, who was elected permanent chairman declared that owing to the lumber shortage and apparently permanent car shortage it will be necessary for the box manufacturers to exert early efforts to meet the requirements of the box-using trade.

At the suggestion of the chairman, G. M. Calef, of the Liberty Box Company of Tacoma, discussed the competition of the fibre container. Mr. Calef advised the meeting that the Carnation Milk Products Company now is using fibre packages extensively in its

domestic trade, but that in his own experience he had learned that buyers almost invariably prefer the wood box; substitution of the fibre container is due to difference in price, only, he added.

W. C. Geddes of the Oregon Lumber Company reported the recent establishment of a fibre box plant at Ogden, Utah—the center of the canning industry in that state. This industry, he said, formerly used 7,000,000 feet of box shooks annually. In 1919 at least 10 per cent of these requirements were furnished in fibre and he anticipated that even a greater proportion of fibre will be used this year.

In 1919, he explained, the two-pound fibre case sold at \$11.90 per 100, delivered in Utah, which was substantially lower than wood boxes could be sold for. He enumerated the objections raised by the trade against the fibre container and reported on the new fibre box made of waterproof material.

C. M. Crego of the Western Pine Manufacturing Company of Spokane, declared that fibre will not materially affect the large volume of shook business available. He suggested that ultimately waste from the box factories may be used in producing fibre containers.

George E. Chaffee of the Lumber Products, Ltd., Vancouver, B. C., outlined the conditions under which the British Columbia box manufacturers operate, advising the volume of their local market and how they have urged upon growers to take delivery of fruit boxes beginning in December, 1919, and continuing at the manufacturer's option until June and later. This practice has been established satisfactorily by British Columbia operators and will forestall the possibility of a very large shortage of containers for handling the fruit crop of that district. Apple boxes there are now selling at 26c delivered, or 24c F. O. B. mill.

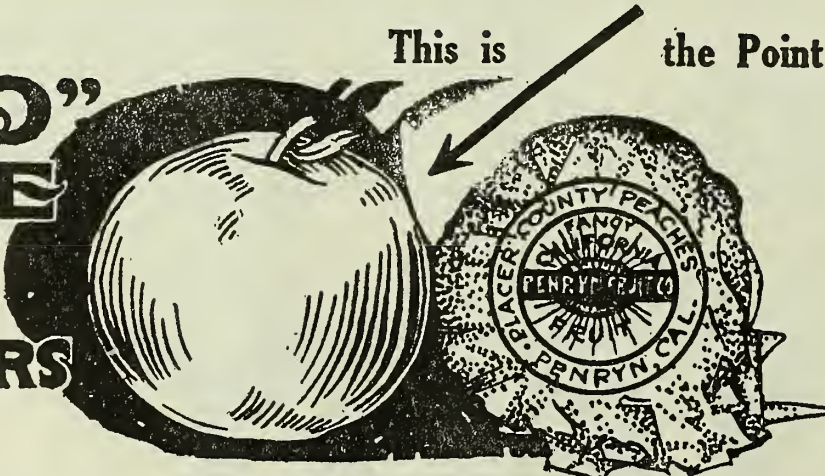
G. A. Parkins of the Brooks-Scanlon Lumber Co., of Bend, Oregon, said his plant, which cut 15,000,000 feet into box shooks in 1919 was operating very light on account of low and greatly broken lumber stocks. He said that the average cost of converting lumber into shooks ranges from \$11.35 to \$13.00 per 1,000 shook footage. With Mr. Parkins leading the discussion and various members participating, it was found that the waste of conversion ranges from 10% to 20% of the lumber utilized, which with the manufacturing costs and value of lumber, brought the cost of shook production from \$50 to \$60, depending on the grade of lumber utilized.

J. L. Reeder of the California Peach Growers, Fresno, California, spoke of the large and growing demand for all classes of fresh and dried fruit packages and vegetable crates in the California markets. He stated that the present consumption of box shook in the state of California approximates 550,000,000 feet per annum, while the increased acreage now set and rapidly coming into bearing would increase this consumption to approximately 800,000,000 feet within five years; he stated in the Fresno district there are 50,000 acres of peach orchards, with 10,000 to 15,000 added acres coming into bearing within the next few years. There are 200,000 acres of raisins and shipments in 1919, approximated 35,000 tons of peaches and 200,000 tons of raisins. The fig crop in the Fresno district is rapidly increasing and will be ten times as large as at present within a comparative short time. The approximate acreage of figs at present is from five to ten thousand and there is now being planted 14,000 additional acres. In four years the fig acreage will be from 20,000 to 25,000. The raisin and peach crops in the Fresno district consumed 30,000,000 feet of box shooks during 1919. This district requires 3,000,000 drying trays and approximately 1,000,000 sweat-boxes per annum.

Continued on page 36.

**"CARO" FIBRE FRUIT WRAPPERS**

This is the Point



**Chemically Treated  
"Caro" Protects**

"Caro" from DessiCARE (to dry up)

**"Caro"  
Prolongs the  
Life of Fruit  
Why?**

Fruit decomposition starts from a bruise which opens tiny holes and permits the juice to escape and BACTERIA to enter. "Caro" clings closely and dries up the escaping juice. "Caro" ingredients harden the spot, kill the BACTERIA, arrests the decomposition—and thus **PROLONGS THE LIFE OF FRUIT**. If your fruit is worth shipping it is worth keeping in best condition.

**Demand "CARO"—Wrap Your Fruit in "CARO"—The Fruit Buyer Knows "CARO"**

**Order from Any Fruit Company or American Sales Agencies Co., 112 Market St., San Francisco**



## "Sixty Cents a Can for Bartlett Pears"

By Frank T. Swett of the California Pear Growers' Association

"Sixty cents for a can of Bartlett pears. Good night!" So said Jones to the grocery clerk. "What's the idea? I used to buy the same brand for thirty."

Jones is a successful business man of San Francisco. Mrs. Jones has 'phoned his office that afternoon, "Company for supper; we haven't a bit of fruit in the apartment; it's too late to order; now, Dearie, call in at Goldberg? Bowen grocery and bring home a can of nice Bartlett pears."

Jones is a man who wants to be shown. He asked the clerk "What's the reason of this raise?"

"Why, Mr. Jones, don't you read the papers? Senator Browne of Los Angeles, Mrs. Cleverdon of Berkeley, Secretary Connelly of the Grocers' Association, and a whole bunch of mayors are agreed that the farmers are profiteering on us city guys; and wicked Weinstock has organized them into terrible trusts to sting the consumer!"

"Believe me," said Jones, "I'm going to investigate," as he jumped into his Pierce-Arrow and sped home to the apartment.

The next day he talked with a banker on that painfully popular theme, High Cost of Living.

"Inflated currency, diminishing dollar, excessive demand for all foods, restricted production of commodities due to the strike habit—the customary aftermath of all big wars," said the banker. "Mark Sullivan said it in *Colliers Weekly* in his remark that the 'dollar should be renamed and designated a 'dollarette.' We're all trading in fifty-cent dollars. Now, Jones, your sixty-cent can of pears is really a merely old-fashioned thirty cents."

"This is too abstract for me," said Jones. So he asked a prominent canner who recently announced in a financial letter to the press that canners had all made phenomenal profits this season; but now that it had all been sold the price was really too high and that the remedy next year would be to pay the fruit growers less for their fruit. "Growers must not expect such exorbitant prices next season." The canner told Jones all about higher cannery labor costs, etc., but said nothing about higher costs on the farm.

But Jones was thorough. He had been told at second hand, about farmers' combinations. He wanted to beard one in its den. He bravely ventured into the office of the Pear Growers' Association.

The retailer had passed the buck to the "farmers' combine"; the canner had followed suit. The mayor and supervisors of the city that presents gold plates to the Irish president had emphatically berated the far-off farmer. Was this solution correct?

Secretary Hamilton was at his desk. Said Jones, "I'm going to ask some important questions. While I'm making double the money I used to, it takes it about all to live comfortably. Shoes,

clothes, nurses, housemaids, rent, theater tickets, all have gone up; and it's most aggravating to have to pay more for food."

"Why did the grocer charge me sixty cents for those pears? Why don't your association sell the fruit cheaper to the canner? I'm afraid the growers are profiteering. Defend yourself if you can!"

"All right," said the secretary. "Let's analyze your sixty cents." "When you paid, you laid on the counter a four-bit piece and a dime. What did the grower get from the four-bit piece? Not one penny! The grower got the dime. Out of that dime he paid for a whole year's work in the orchard, taxes, irrigation, spraying, plowing, tractors, compensation insurance, spray materials, distillate, housing for employees."

"The owner and his family lived and worked on only four pennies of your dime. Six cents he paid out for employees and orchard expense."

"If the philanthropic grower could afford to work for nothing and board himself, then pears might sell four cents cheaper, or fifty-six cents. Now—Mr. Jones, if you are looking for profiteering, will you seek it in the grower's four cents, or in the other fifty-six cents? Without your dime, production would stop short."

"You surprise me," responded Jones. "I can hardly credit your data."

"Here are the facts," said Hamilton. "The Association sold 14,000 tons to canners at \$85 a ton. A ton will make from 37 to 40 cases of canned pears, or considerably more than 850 cans. At 10 cents a can this is \$85."

"The deuce you say," said Jones. "I don't begrudge the dime, for I realize the production must continue. But where did my four-bits go?"

"That went for canners' boxes, freight, stevedores, deck hands, coal miners, oil men, draymen, cold storage in cannery, wages that are three times as high as formerly, in high freight rates on sugar, perhaps hauled in the ships that made Mayor Rolph a millionaire, for tin and labels and cannery cases, higher wages in lumber camps, rent, clerk hire and delivery for the retailer."

"The canner sold the case of 24 cans for \$8.50. When retailed the same case cost consumers \$14.40. Each can carried a burden of 25 cents in its trip from the canner's warehouse to the consumer, or a total of \$6. When the grocer took your can from the shelf and handed it over the counter, his 20 per cent earned in two minutes, cost you twelve cents, more than the original grower's price on the pears."

"Robbers," said Jones. "Wait," said Hamilton, "doesn't Mrs. Jones usually telephone the store and have goods delivered at your apartment and charged? The grocer's price is set according to customary expense and not by the exceptional occasions when patrons pay cash and carry home. The grocer is

**BEST SERVICE -  
QUALITY & PRICES**

**PERFECTION IN  
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LABELS**

**THE  
SIMPSON & DOELLER CO.**  
1423-24 NORTHWESTERN BANK BLDG.  
PORTLAND, OREGON.  
**E. SHELLEY MORGAN**  
NORTHWESTERN MANAGER

**WE CARRY—AND CAN SHIP IN 24  
HOURS—STOCK LABELS FOR PEARS,  
APPLES, CHERRIES & STRAWBERRIES.**

lucky if he nets 4 per cent after all expenses are paid."

"Just one more question," said Jones. "How about the expense of this Association; isn't it just one more expense between producer and consumer? What does this cost, and who pays it?"

"It came out of your dime," said Hamilton. "In 1919 the business of 450 growers, producing about half the pears of California, was handled at an average cost, not of 20 per cent, not of 10 per cent, nor of 5 per cent; but the almost microscopic and infinitesimally small charge of two-thirds of one per cent on the growers' whole output."

"Canners used to have scores of buyers in the field at an expense of \$1.50 to \$2.50 a ton for the fruit purchased. This needless expense is practically eliminated. One man, the manager of the Association, does all the selling, at minimum expense."

"And furthermore, out of the Association charge to growers of ninety cents a ton on the canned pears, there is provision for inspection, shipment, billing, collection, and remitting the grower, and included also adequate financial insurance. This is credit indemnity insurance. Should a cannery fail to pay the Association, the American Credit Indemnity Company pays, just like fire insurance."

"You astonish me," said Jones. How do you get by so cheap?"

"Because this is modern, scientific, coöperative marketing. We have had the assistance in organizing of a man who is one of California's most success-



ful merchants, a man who has studied marketing the world over, a man who has done more to encourage food production and to stimulate California agriculture than all others put together—State Market Commissioner, Colonel Weinstock."

### UNQUESTIONABLY—

Modern methods applied to fruit growing have made the Northwest a great fruit growing center, with possibilities of extensive development.

Modern methods applied to banking have made the FIRST NATIONAL BANK pre-eminently the ally of the horticulturist. Its facilities, service and the personal interest of its officers are at your disposal.

THE FIRST NATIONAL BANK  
OF PORTLAND OREGON  
THE FIRST NATIONAL BANK WEST  
OF THE ROCKY MOUNTAINS

### STRAWBERRY PLANTS

Everbearing, bear this year. Superb and Americus, \$2.50 per 100, \$5.00 per 250, postpaid. Catalog free.

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### "That's Relief for My Rheumatic Aches"

SLOAN'S LINIMENT is an effective counter-irritant that penetrates to the affected part, without rubbing, scatters the congestion, and promotes a warm, comfortable relief. Try it when your "bones ache" and you feel you "can hardly stand up any longer."

For more than 38 years Sloan's Liniment has been used by the families of the nation in quickly relieving rheumatic aches, lumbago, neuralgia, sciatica, lame, sore, strained muscles, bruises and other pains and sprains.

Put up in convenient bottles in three sizes—the larger the bottle the greater the economy. 35c., 70c., \$1.40.

**Sloan's**  
Liniment  
Keep it handy

"But don't associations stifle competition?"

"On the contrary, they encourage competition of a new kind—constructive, not destructive. Speculation is lessened or eliminated. The grower encouraged, bends every energy in competing with his neighbors for better quality and increased production. New fields and orchard lands are cleared and planted. You consumers want more to eat. Better methods mean better crops. Better spraying and cultivating means better quality. Maximum production means reasonable prices."

"This Association has directors' meetings monthly. In winter and spring these meetings are held in the different fruit districts. Growers attend; last week 69 growers of Santa Rosa met our directors from other sections and a day was spent in planning, with the assistance of scientific experts, better cultivations and spraying methods. This means increased production of better fruit for you, Mr. Consumer."

"In a few years, California, instead of 100,000 tons of pears, will produce 300,000 tons. Does that sound good to you?"

"Have we hampered canning and drying by Association prices? No. This season the greatest pack of pears on record, over 30,000 tons, was canned. Twice the usual tonnage was dried. practically none went to waste."

"The smallest canner can buy his

little supply, perhaps only 40 tons, at the same price and of the same quality as the buyer who buys 5000 tons. Does this encourage him to put up a full pack? I guess yes."

"One canner, who had ordered 400 tons before we named a price, upon being notified of the price on June 2, came to the office the next day. 'Increase my order to 900 tons—your price is reasonable, and we are going to strain every effort to put up a larger pack than ever before.'

"We marketed this year \$1,100,000 of pears, without the loss of one cent in bad accounts. Canners have dealt with us squarely and honorably."

"We have stabilized the Eastern markets for fresh pears by diverting the surplus, which formerly used to bring about a regular disastrous slump in August, to driers and canners."

"We are a group of 450 growers pulling harmoniously together, trying to serve faithfully both producer, manufacturer, and consumer. We've made a good beginning in our first two years. We can do more and better work in future years. Other growers' associations are working along similar lines."

"I'm glad I called," said Jones. "Next time I hear earnest but misguided and ignorant politicians roasting the producer and his marketing associations I'll call has bluff and demand less eloquence but more facts."

And he departed, feeling better.

## More Apple Storage Needed in Northwest

IF big losses are to be avoided in the marketing of the Northwestern apple crop, growers will be forced to give greater attention to equipping their properties with up-to-date storage houses than they have heretofore, says the Bureau of Markets, United States Department of Agriculture.

Because of increased production and an acute shortage of refrigerator cars last season, growers in the Northwest were unable to move their apples to market and thousands of boxes of fruit were caught unprotected in the orchards by an early freeze, while other fruit remained on the trees and was frozen because there was no place to store it.

Since 1900 the production of apples in the Northwest has increased enormously, until last year Washington, Oregon, and Idaho, with the help of Montana and Colorado, produced over one-quarter of the total crop of the United States, and with new acreage coming into bearing it is likely that the Northwest in a few years will be producing a much greater part of the country's total crop.

Under present conditions it is impossible for the railroads to move the crop to market during the harvest season. And the growers with existing scarcity of labor can not grade, pack, and prepare the crop for market in a period of two or three months. This situation has brought home to growers the necessity of providing better storage facilities in the producing districts.

In response to many inquiries for information on storage houses, the Bureau of Markets, United States Department of Agriculture, has sent a specialist to the Northwest to assist growers and shippers in the planning and construction of common storage houses. The bureau points out that it is not enough to build a storage house, but that it must be built right, or the apples will not keep. Investigations have shown that much money has been wasted through improper construction of houses.

"Too often the grower builds by rule of thumb," says the bureau, "and does not consider that a storage house must be built like a thermos bottle—to keep heat in when the weather is cold and out when it is warm. Houses must be well insulated and ventilated. Almost invariably apple storages fall short of actual requirements in ventilation. Small ventilators are used when large ones could be supplied at little more or no more expense, and the large ventilators would add 50 per cent to the efficiency of the storage house."

The special bureau representative now in the Northwest is supplied with working drawings of storage houses that have been tested during the past five years, and is prepared to assist personally growers who expect to build during the spring and summer. His headquarters will be at the branch office of the Bureau of Markets, Yakima, Washington.



## Canners Celebrate Centenary of Canning

By Frank Gorrell, Secretary National Canners' Association

THE National Canners' Association recently celebrated the centenary of canning at their annual meeting which was held at Cleveland, Ohio, at which there were in attendance several thousand members. The growth of the canning industry, which is carried on in the United States on a larger scale than in any other country in the world has been remarkable.

Canned food was unknown on this continent until one hundred years ago Ezra Daggett and Thomas Kensett of New York, succeeded in canning or packing in a crude way salmon, lobsters and oysters. Meanwhile, in Boston, William Underwood and Charles Mitchell, using heat, which we now call sterilization, in 1820 succeeded in packing some damsons, quinces, cranberries and currants.

Credit for the discovery of the method of keeping perishable food by heat and sealing in air tight containers, however, belongs to a Frenchman, Nicholas Appert, stimulated by an offer from Napoleon of 12,000 francs to anyone who would discover a method of conserving fresh food so that he could improve the diet of his troops, after fifteen years of experimenting, in 1810, discovered the method of using heat to preserve food in sealed jars. Appert, however, never understood the scientific basis of his discovery, nor did succeeding canners have any clear idea of why the process worked, until after the great bacteriologist, Louis Pasteur, discovered bacteria.

Using Pasteur's discovery, Prof. H. L. Russell of the University of Wisconsin, in 1895 found that the spoilage certain pea canners were having was due to bacteria which resisted their process and that higher temperature of sterilization was necessary. Professor Russell's experiments were confirmed in 1896 by Professors Prescott and Underwood of the Massachusetts Institute of Technology.

In 1840, Baltimore began the canning of oysters and in 1841 Maine started its sardine industry. It was not, however, until 1856 that canning began on the Pacific Coast. The first canning factory in the center of the country was established in 1860 for feeding troops in the Civil War.

More than three billion cans of food canned under modern American methods, were used to feed our own troops in the American Expeditionary Forces. It is largely due to the American canning industry that American diet can follow the flag wherever our soldiers and sailors protect our rights, or wherever American pioneers blaze new trails for American activities.

To the improvements developed by modern canning science every family owes its ability to get succulent food the year around; to have fish far from the fishing banks, to enjoy meats away from production and to have milk for adults and despecially the babies in cow-



## TOP DRESSING TALKS, No. 5

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The advantages of Arcadian Sulphate of Ammonia are:

**High Production:** Pound for pound of nitrogen, *Arcadian Sulphate of Ammonia* will produce as much crop or more than any other nitrogenous top-dressing. It's dependable.

**High Concentration:** *Arcadian Sulphate of Ammonia* contains one-third more nitrogen than any other top-dressing. This lowers cost of handling, hauling and storing.

**Quick Availability:** *Arcadian Sulphate of Ammonia* acts quickly. The moisture in the soil immediately dissolves the crystals. In many cases a change in color of the foliage of plants has been noted within three days after application.

**Non-Leaching:** The ammonia is absorbed by the organic matter and by other soil constituents, and is not easily washed out, even from the lightest soils. It is made available by the same conditions of warmth and moisture that cause plant growth, and this acts as a reservoir of plant food in the soil, yielding a regular supply of nitrogen as it is needed.

**Fine Mechanical Condition:** The crystals of *Arcadian* are fine and dry. There is no appreciable absorption of moisture and it does not cake into hard lumps. This makes application easy and assures even distribution by hand or machine. No labor is required for grinding or screening.

These with other important advantages, including low price, make *Arcadian* the supreme top-dressing fertilizer. As a feeder of plants, it is *quick, enduring and satisfying*.

Write for bulletins on the proper use of

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## *Sulphate of Ammonia*

*Sulphate of Ammonia* is the well known standard article that has done you good service in your mixed fertilizers for years past.

*Arcadian* is the kiln-dried and screened grade, made fine and dry for top-dressing purposes. Ammonia 25¼% guaranteed. Made in U. S. A. It is "The Great American Ammoniate."

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For information  
as to application,  
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The *Barrett* Company

Agricultural  
Department

510 First National Bank Building, Berkeley, Cal.



less country, or when blizzards block the milk trains to our cities.

Even more important is the fact that through canning the plenteous fruits and vegetables of harvest seasons; the great catches from our fishing banks during spring, summer and fall; the juicy meat of the grazing season and the flood of summer milk can be held over for winter use when production is interrupted or lessened.

In addition to feeding our own population, Frank Gerber, of Fremont, Michigan, president of the National Canners' Association, feels that there will be a tremendous demand from all parts of the world for American perish-

able foods. Much of this demand Mr. Gerber believes can be supplied only if the canning industry exercises every effort to put under seal all fruit and vegetables not needed for immediate consumption.

Joining with the National Canners' Association in this convention were the National Canned Foods and Dried Fruit Brokers' Association, and the Canning Machinery and Supplies Association. Coincident with the opening of the second century of the canning industry is the campaign of education and advertising, and the extension of the voluntary inspection service.

number of cars put out of use since then was stated to be 10,000, which have been taken from the supply allowed the fruit industry. In discussing transportation conditions the idea was put forth that the public must be patient with the railroads until such time as they could expand and build new roads, more cars and make other necessary improvements.

It was declared that fruit and produce prices as well as those of other commodities must seek lower levels before the business could be said to be on a stable basis and the maximum consumption expected.

While little definite action was taken by the convention among the most important was the decision to abolish bank guarantees on fruit and produce shipments. The procedure in future will be to take shipments on consignments when accompanied by satisfactory references, or to pay cash before the shipment is made. The tier pack for apples for trading purposes was adopted and a return to the minimum carload shipment in use in 1914 recommended, except where equipment is constructed providing for a larger capacity.

The social features provided for the entertainment of the visitors are said to have been the most lavish ever provided at a meeting of the fruit jobbers. During their sessions Governor Stephens and Mayor Rolph made addresses. At one of the meetings which was held at the University of California, in Berkeley, Dean Thomas F. Hunt delivered an address of welcome. Subjects discussed at the university were: "Transportation of Fruits," by H. J. Ramsey, California Fruit Growers' Exchange, Los Angeles; "Spraying Orchards," by W. L. Howard, head of the Division of Pomology of the University; "Recent Investigation of Cold Storage of Fruits," by E. Loverholzer, same division; "Grading, Packing and Standardization of Fruits," by G. H. Hecke, Department of Agriculture of Sacramento; "Investigation on Fruit Products," by A. W. Christie of the Viticulture department.

## Uplift in Methods, Slogan of Fruit Jobbers

THE annual convention of the Western Fruit Jobbers, held at San Francisco during the past month resulted in one of the largest gatherings in the history of the organization, the registration totaling over 2600. Many men prominent in all lines of the fruit industry were present and the proceedings showed an earnest desire to institute better methods of buying, handling and distributing. It was the consensus of opinion at the convention that methods should be adopted providing for wider publicity in keeping both the producer and consumer informed on the affairs of the jobbers and to show the public generally that the business was conducted on a fair and legitimate basis

instead of by dishonest methods, which, it was said, seemed to be the prevailing idea.

One of the things of most importance to the grower and shipper brought out was that there is a shortage of 10,000 refrigerator cars for use in the fruit industry and that greater transportation facilities must be provided to successfully handle the business. According to a report made at the convention, in 1914, at the beginning of the war, there were 114,000 refrigerator cars in use for the transportation of perishable products. Thirty-five thousand of these were reserved for the use of the meat packers while 79,000 were allotted to the fruit and vegetable industry. The



### BETTER STRAWBERRIES

We have one of the largest stocks of pure Aroma and Klondike strawberry plants in the country. Also nice lot of Excelsior, Gandy and Early Ozark.

We have more orders booked than we ever had before at this time. Write for prices, we would like to book you before our supply is exhausted.

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CHATTANOOGA, TENN.

## "I Don't Need to Tell You" says the Good Judge



Why so many men are going to the *small chew* of this good tobacco.

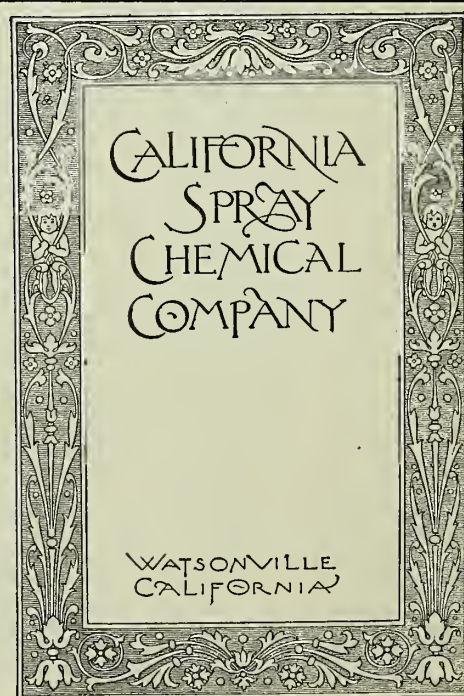
You get real tobacco satisfaction out of this small chew. The rich taste lasts and lasts. You don't need a fresh chew so often. Any man who uses the Real Tobacco Chew will tell you that.

### Put Up In Two Styles

RIGHT CUT is a short-cut tobacco

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Dow Powdered Lead Arsenate  
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## GOOD PROFITS

Every successful grower of fruit realizes that it is impossible to produce good fruit without spraying. Satisfactory results cannot be obtained from inferior materials, and superior materials cannot produce the proper results if they are carelessly applied. Obviously it is not possible for the manufacturer of Insecticides to superintend the application of his products. This must be done by the grower. But, the manufacturer is responsible for the integrity of his materials. He should establish the highest possible standard for his goods and should maintain that standard always. To this latter phase—the manufacturer's responsibility, as applied to The Dow Chemical Company's line of Insecticides—we invite your attention.

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Was a large producer of war materials.  
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Is the country's greatest producer of Indigo Blue.  
Owns one of the best chemical libraries in the country.  
Has made dependable Insecticides for many years.  
Has the confidence of America's largest fruit growers.

### OUR PLANT

Covers over one hundred acres of ground.  
Includes over ten miles of railroad track within the property.  
Employs over 100 graduate chemists.  
Keeps busy over 1,500 loyal employees.  
Is run on the Profit Sharing plan.  
Has been built by honest service in the manufacture of essential chemicals.

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INSECTICIDES ARE DISTRIBUTED AT IMPORTANT  
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## INSECTICIDE DEPARTMENT

MIDLAND,  MICHIGAN



# BETTER FRUIT

An Illustrated Magazine Devoted to the Interests  
of Modern Fruit Growing and Marketing.

Published Monthly  
by

Better Fruit Publishing Company

703 Oregonian Building  
PORTLAND, OREGON

## The Apple Marketing Situation.

The present condition of the apple market, which is reported dull and with much larger stocks in storage than was the case at this time last year was not altogether unanticipated. It is reported that the cause for this condition is that apple prices were started too high early in the season; that considerable tonnage was held for still higher prices; that the car shortage delayed the fruit from the Northwest in getting into consumption and that dealers on this account were unable to move the later flood of box fruit except at falling prices. The unexpected freeze also contributed to the unsettled condition of the box apple market on account of the shipping of frosted fruit or having it frozen enroute due to using unprotected cars. The limited foreign market also played an important part in the situation—and one other point, probably the most important of all—lack of national advertising.

In the June and September numbers of BETTER FRUIT attention was called to the possibility of the present condition of the apple market ensuing, with the exception of the freeze, a contingency so unusual in the Northwest that it can be largely discounted.

Of course alibis are now in order and the next few months will be replete with reports telling "how it happened." What the grower and shipper is most interested in, however, is not an alibi, but a possible remedy and it looks now as if a concerted movement would be made to obviate as far as possible in future the unfortunate conditions that characterized the present apple shipping season. More storage and more cars will undoubtedly be provided and it is only reasonable to expect that the foreign market for box apples must expand. The matters of price fixing, holding in storage for unreasonable values, flooding the market and stimulating consumption are the questions that require the most serious consideration.

These problems have been solved by the growers' marketing associations in California and there is no reason why the apple grower should not take a lesson from their book. The price is fixed before the fruit is sold on a basis that will move the entire crop, distribution controlled and consumption expanded by bringing the products to the attention of millions of people through advertising. This season while prunes, peaches, pears, raisins, oranges, walnuts and other fruits were being featured to reach the eyes of millions of readers the advertising for apples was almost negligible, the result being that in thousands of instances other fruits were substituted.

The Northwest apple grower must get into the marketing game on the

same basis as the grower of other fruits on the Pacific Coast to achieve the desired results. While his experience this year has been far from disastrous it should serve to guide him into other and better channels in future.

## Commercial Fertilizers.

Commercial fertilizers have become recognized as one of the most valuable aids to the fruit grower as well as those engaged in other lines of agriculture. By their use new life is put into soils that are deficient in some crop producing constituent and heavier, and better quality yields are the result. A new angle is brought out in the use of commercial fertilizers in an article in this issue by Prof. Thornber in his statement that they are labor savers by taking the place of intensive tillage in securing the maximum production. In making this statement Prof. Thornber pre-supposes that the fertilizer will be intelligently applied and used on soils that have been heavily cropped.

The value of commercial fertilizers is in their being used at the right time in the right quantities and with the same care and discrimination that would be taken in using stable manure or any other soil enriching material. The benefits of standard brands of fertilizers are unquestioned, it is simply a case of knowing the condition of your soil and plant life.

## The Fruit Box Supply.

Fruit growers and shippers are being warned by the big lumber companies on the Coast that unless they want to be caught without a supply of boxes this year they should place their orders early. The statement is forthcoming that the demand for lumber of all kinds is so great and prices so high that the supply of box material will be short. At first glance this statement gives the inference that the lumber companies are preparing to gouge the grower, but investigation shows that such is not the case. A report from the Federal Reserve Bank in this district shows that the car shortage, labor shortage and unfilled orders for lumber is of such a magnitude that the box output is a secondary consideration. The lumber companies have stated that they will do everything in their power to meet the needs of the fruit grower and canning industry, but in order to do so must be given estimates for boxes early in the season. As boxes are a vital need to both the fruit grower and the canner, it will be the part of wisdom to heed the warning.

The Western Fruit Jobbers are preparing a publicity campaign to inform the public that they are not a bunch of crooks and that their business is carried on on a legitimate basis. The fruit jobbers, like those engaged in other branches of business have suffered from the odium of the few who have been unscrupulous. There is a concerted movement both in the East and the West to drive this character of dealer out of the business and his going will be highly appreciated.

According to Frank T. Swett of the California Pear Growers' Association, the grower gets the dime from a can of pears that sells for 60 cents and the canner, jobber and retailer gets the other four-bits and yet none of the handlers of this product receives an inordinate profit. The question is how long will consumption be maintained at the already high and increasing figures?

A lesson is learned from the Okanogan fruit growers who quickly constructed a warehouse of baled hay to save their apple crop from freezing. Growers in other districts who may not have baled hay, may have something else which will serve the purpose in case of an emergency.

## What the Newspapers Interested in Fruit Are Saying.

A recent bill introduced in Congress provides for standard hampers, splint baskets and apple boxes. Thus the campaign for standard containers goes on. In the course of time it is probable that the dozens of different sizes and styles of containers seen on any market will be replaced by a few of standard size and style.—*The Packer*.

The tree doctor is again abroad in the land. Reports are coming in from various sections that men are going about the country doctoring trees in various ways. These ways are generally secret. Operations are performed on trees, money collected for the cure that is sure to follow and the doctor goes on his way, leaving a hopeful but sure to be disappointed owner in his wake.—*Southern Ruralist*.

The light tractor is making good in our Ontario orchards. It is only a couple of years since the light tractor was first introduced into Ontario as an experiment, but the past year has seen a tremendous increase in the number of these machines used on Ontario fruit farms. Shortage of help with its attendant necessity for greater accomplishments by the man power available has paved the way for the tractor and the low-down fast-working orchard implement.—*Canadian Horticulturist*.

With proper care and attention, there is no reason why budded and grafted trees will not be as long-lived as old time varieties. The earliest definite history of a grafted tree is a Summer Boncretien, from Europe, planted by Governor Stuyvesant at New Amsterdam in 1647. The trunk of this tree remained standing in New York City on the corner of Third Avenue and Thirteenth Street until 1866, when it was broken down by a dray running over it. Here we had a grafted tree standing at the ripe old age of 219 years. This seems to us to prove that the longevity of a tree is not necessarily determined by whether it is grafted or seedling.—*British Columbia Farmer*.

Farmers' institutes provide a contact between men who are giving their lives to scientific experiment, and the ordinary farmer, who can not afford to take time and to give up land for such purposes. The experiment station may make a dozen unsuccessful trials, for one that will work. But the one successful experiment may show results which would raise the production of some staple far above existing standards. It will pay the farmers to sacrifice some valuable time to attend these meetings. Information is constantly being given out that will raise agriculture to a more profitable level.—*Toppenish (Wash.) Tribune*.

## TO OUR READERS

If you have a short story or have had an experience that you think will be of practical interest or value to the fruitgrower, send it to BETTER FRUIT. If you have a photograph to illustrate your idea or story send that too.



# Harvesting and Marketing English Walnuts in Oregon

By Arthur S. Moulton, Mollalla, Oregon

**L**IKE many another, the author of this article is but one of the many Westerners who are enthused, confident and alive to the possibilities that lie in the development of the nut-growing industry on the Pacific Coast, and especially in the Willamette valley. The certainty of good returns, both financially and otherwise, and the comparative ease of handling the orchards and the annual crop of nuts, are two of the biggest inducements and attractions in this phase of horticultural work.

To attempt to write an article on the general subject of nut growing would require an entire magazine in itself, were the subject properly handled. However, the lack of material dealing with walnut culture, especially as regards certain phases of it, has induced the author to keenly peruse what little information there is available and together with his own experience and observations, to present a concise and at the same time a detailed article on this topic for the interest of those readers of BETTER FRUIT, who, too, have a more or less interest in the subject itself.

As in the case of the Italian prune, one of the most simple operations in the handling of the crop of walnuts is that of gathering them. The gathering commences in the middle of the fall at the time when the hulls of the nuts begin splitting and the nuts start dropping. In most orchards there are four pickings, that is, the work is so planned that each tree is gone over four times, at intervals of about four days, the picking crew being kept busy by starting at one side of the orchard and working straight across. By the time the entire orchard has been worked over, it is about time for the crew to start in again at the other side. During the first two or three gatherings, only those nuts lying on the ground are taken, while on the later rounds the branches of the trees are shaken by means of a hook attached to a light pole, care being taken, however, not to injure the branches of the trees.

As the nuts are gathered, they are usually divided into two grades, the nuts which are well-matured being segregated from the cull nuts, and later handled separately at the drier. During the gathering the nuts are either sacked under the trees, stacked in piles without being sacked, or else placed directly from the picker's bucket into the wagon, to be carted thence to the drier.

The next step in the handling of the crop is the drying of the nuts. On the coast here there are two methods of doing the drying, one by exposure to the sun, a method in use in the warmer regions of California, and the second by means of artificial heat, the common method in the Oregon sections. Under the California method, the nuts, after being thoroughly washed, are placed in broad, shallow trays and so arranged and assembled as to receive the maximum amount of sunlight. The principal disadvantages of this method, how-

ever, are that the sunlight is often unreliable, that the nuts cannot be exposed to a temperature greater than 90° Fahrenheit, and that the trays must be covered every night because of excessive dampness prevailing at that time of the year. Under the Oregon method of artificial drying, which is, by the way, the only practicable method of handling the crop in this section of the coast, the drying is all done in buildings either erected purposely for that process or in buildings previously used for drying prunes and which are readily converted into walnut driers by the addition of washing and grading

machines such as are used in the California orchards. Incidentally, too, an added advantage of the artificial drier here is that the owner of the orchard can literally "kill two birds with one stone" by planting Italian prune trees as fillers when he sets out the walnut orchard. In this manner the prune trees will furnish crops available for drying in the drier at a fine profit until such time as the walnuts come into heavy bearing. By that time the walnut trees so crowd the prune trees that the prunes are usually removed, incidentally, too, being disposed of at a time when the walnut trees are begin-

Continued on page 24.

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To spray your trees yearly with **ZENO**  
Is to practice ideal Orchard Prophylaxis.

To protect and defend your trees from disease  
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Have clean bark, vigorous limbs, greener leaves;  
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### *The Cletrac's Day is Here*

The tide has turned. The *big* demand to-day is for the small tank-type tractor—for the Cletrac—that goes further than the simple job of plowing and takes the place of horses over plowed ground and seedbed, working faster and at lower cost.

It wanted only the marvelous success of the Cletrac in 1919 to make the bulk of farmers *everywhere* put their "OK" on the small tank-type. And now because the Cletrac is the "fashion"—because a greatly increased output, means a lower manufacturing cost—we can offer a better Cletrac and still reduce the cost to you.

With more power and improved construction, 1920 will prove to any farmer, anywhere, that Cletrac farming is *profitable* farming.

The Cletrac is the right size and type for almost any farm, the one tractor adapted to all conditions. It has proved its ability to stand up to its work. And now that the public has recognized its worth, it is out in front to stay.

The quick popularity of the Cletrac is not an accident. Engineers and army experts long ago saw the great advantages of the endless track as a device for turning motor power into drawbar pull. The farming public only waited to see the same principle built into a *serviceable* small tractor. The Cletrac proved to be that tractor. It made lifelong friends from the start.

One Cletrac on the small farm—a "fleet" of them on the big ranch—makes an ideal all-year power plant. The Cletrac is light, but powerful, with plenty of pull for heavy plowing and work in the hills. And it rides the low spots or plowed ground without miring, but still pulls a profitable load.

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Cleveland Ohio

*Largest Producers  
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in the World.*

*"Selecting Your Tractor" is a book you should have right away.  
The Cletrac dealer has one for you, or we will gladly send one free.*

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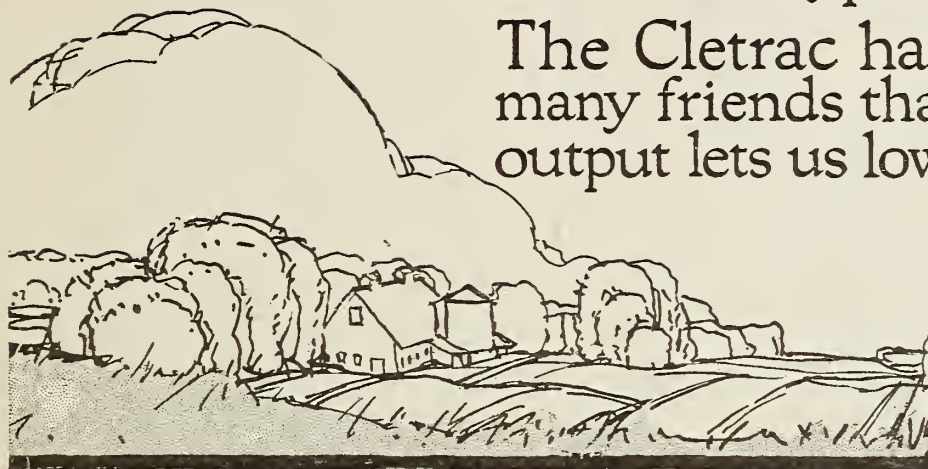
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In the improved Cletrac you get all the little refinements an honest builder makes with each year of brass-tack experience. And you get certain big features that make it a better performer than ever.

A bigger motor and the added strength to handle the increased power are furnished with no extra weight and no more friction, saving you *all* the power we've added.

The new 8-inch track—one-third wider—means a lighter tread and stronger grip on the ground—makes the Cletrac that much more sure-footed and adds to the life of the tractor itself.

The Cletrac steering device, an exclusive feature, insures positive power to *both* tracks *all* the time and gives full power on the turns, as well as straightaway.

Our new water clarifier takes out all the air dust that would grind your pistons and overheat your motor—moistens the air and makes the engine run as smooth at noon as your auto on a dewy night.

Here is a tractor, always a vote-getter, now more powerful, now better built, and costing you less. No wonder the best tractor dealer in your community wants to handle it. A tractor that makes friends for itself makes satisfied customers for him.

Right through the year—hauling manure in the Winter—plowing, harrowing and seeding in the Spring—cultivating orchards all Summer long—road-building, ditching and grading—shelling corn and sawing wood—here's a tractor you can depend upon.

It's a tractor that has all-year service built into it, one that cuts farming costs by handling *all* jobs well, not just a few. And over 1200 distributors and dealers, with repair stocks near you, are backing it up to make every Cletrac owner a booster.

There's a good dealer close by who will gladly show you a Cletrac. Talk to him now. Get ready to start Cletrac farming this Spring. Line up with the majority and make power-farming really worth while.

More Kinds of Work  
More Days in the Year

Send in the coupon, or see the Cletrac dealer at once.  
Don't wait until Spring work starts—get ready now.

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San Francisco  
Spokane

TANK-TYPE  
TRACTOR



Continued from page 21.

ning to require the bigger portion of the grower's attention.

The method used in drying and washing the walnuts is similar to that used with the prune crop. The usual method of picking and drying is to have the crew pick one day and dry the next. After picking the nuts are placed in water and thoroughly washed to remove the dirt and other materials. A common method is to use the prune washers, with special arrangements of some sort to collect the fibre from the nuts, usually accomplished by means of false bottoms, as the fibre is generally given off in large quantities. A special note might well be added at this time, too, as to the possibilities lying in the utilization of the by-products from the nuts. The fibre given off may readily be dried and used for various purposes, while the present demand for dyes

tends to make the production of walnut dye very profitable, the color of the walnut dye being one that has not as yet been equalled.

After the nuts are thoroughly washed they are deposited in broad shallow trays, having a meshed wire of one-quarter to one-half inch for a bottom. The trays are then placed in tiers, arranged on a slight slant, on a truck, the trucks then being hauled into the drying rooms. Here the nuts are kept at a temperature varying from 75° to 90° Fahrenheit for two days and a night. During the drying extreme care is necessary to see that the stipulated temperature is maintained, for if the heat falls to below 70°, mold will quickly develop on the nuts, while if it exceeds 90° the nuts may crack open and the oil therein may become started, re-

sulting in the nuts rapidly becoming rancid and unfit for use.

As to the heating, the drier may be heated either by hot air or by steam pipes. The hot air method has proven highly satisfactory and is by far the cheaper, the principal objections to it being that the dryer itself must be carefully arranged so as to afford uniform heating and incidentally, that there is an extremely disagreeable odor given off at times if the furnace gets too hot. As to steam heat, it is by far the more expensive to install, there is always danger of the pipes leaking, and the pipes must all be carefully drained in the fall to prevent them from freezing.

While California growers make a common practice of bleaching their nuts, this practice has not become prevalent in the Oregon districts, the northern public readily and eagerly taking all of the Oregon output without requiring that the nuts be bleached. Though all of the California crop is put through the bleaching process, as long as the northern crop is so readily disposed of without being bleached, Oregon growers do not intend to do so, as it makes an additional expense item and is thought by some to be harmful to the walnuts.

After the nuts are dried thoroughly they are graded, although little grading has as yet been practiced in this state with walnuts. However, as the yield and demand for the Oregon nuts continues to increase, grading will become as essential as with other Oregon crops, the grading of the crop not only raising the market standard, but will readily repay the grower for the amount of labor involved.

The grading may readily be done by the use of any of a large number of mechanical devices on the market. In California a common practice is to place the nuts in large meshed trays, shaken by machinery, the graded nuts falling out and being conveyed by means of belts to the sacking room, the established grades there being grade one, composed of nuts larger than one inch in diameter, grade 2, of nuts between three-fourths and one-inch in diameter, and the culls.

After the grading process, the nuts are sacked, the usual container being the gunnysack, of the type commonly used for wheat, and holding about fifty pounds of nuts, although other types of containers are often used. When the nuts are graded No. 1, extra fancy, they are often put up in cartons and sold to high class trade. The cartons usually hold one or two pounds of nuts, and if attractively put up and labelled, are valuable in advertising one's product. Such an article seldom fails to attract the public, and invariably results in a repeated demand for the "\_\_\_\_\_ " brand of walnuts, grown at "\_\_\_\_\_ " by "\_\_\_\_\_ ". The cartons should be neat and attractive and plainly labelled with the grower's name, address and guarantee on the outside.

Prices received for the sale of the nuts on the market vary widely, from a quotation of thirteen cents for sec-

## Last Big Block of Canadian Pacific Reserved Farm Lands

**T**HIS announces the offering of the last big block of the Canadian Pacific Reserved Farm Lands. Until this block is disposed of you can secure at low cost a farm home in Western Canada that will make you rich and independent. The country is ideal for mixed farming as well as grain growing. Later, the same lands can be bought only from private owners — and naturally, prices will be higher. Never again on the North American Continent will farm lands be offered at prices so low.

### Your Last Big Opportunity

This block contains both fertile open prairie and rich park lands in the Lloydminster and Battleford Districts of Central Alberta and Saskatchewan. You can buy farm lands on the rich prairies of Manitoba, Saskatchewan and Alberta at prices averaging about \$18.00 an acre. Or land in Southern Alberta under an irrigation system of unfailing water from \$50 an acre and up.

### Twenty Years to Earn and to Pay

The Canadian Pacific offers you this land under a plan of long term, easy payments that is remarkable in the history of farm investments. You pay down 10%. Then you have no payment on the principal until the end of the fourth year, then fifteen annual payments. Interest is 6%. In central Saskatchewan, Seagar Wheeler grew the world's prize wheat. World's prize oats were grown at Lloydminster.

### Lands Under Irrigation

In Southern Alberta, the Canadian Pacific Railway has developed the largest individual irrigation undertaking on the American Continent. This district contains some of the best lands in Canada. An unfailing supply of water is administered under the Canadian Government. Prices range from \$50 an acre up on the same easy payment terms. \$2,000 loan in improvements; twenty years to pay back.

**M. E. THORNTON**  
Supt. of Colonization

**Canadian Pacific Railway**  
960 First Street, E., Calgary, Alberta

For all information about Canada, ask the C.P.R.



### No Taxes on Improvements

There is a small tax on the land—seldom more than 20c an acre for all purposes, but there are no taxes on your livestock, buildings, improvements, implements or personal effects. Good markets, modern schools, roads, churches, amusements, make farm life desirable and attractive. Here you can achieve independence.

### No Sale Without Investigation

The Canadian Pacific will not sell you a farm until you have inspected it. You must be satisfied—and every question answered before taking up your home. Investigation is invited and made easy. Don't delay your investigation. This announcement calls attention to the last great block of Canadian Pacific Reserved Farm Lands.

### Special Rates for Homeseekers and Full Information

Special railway rates for homeseekers make inspection easy. Send now for free illustrated pamphlets answering all questions and setting forth figures about land values, acreage yields, climate, opportunities, etc. Do not delay. Send coupon below for information.

**M. E. THORNTON**, Supt. of Colonization  
**CANADIAN PACIFIC RY.,**  
960 First St., E., Calgary, Alberta

I would be interested in learning more about:

- ☐ Irrigation farming in Sunny Alberta.
- ☐ Farm opportunities in Alberta, Saskatchewan and Manitoba.
- ☐ Special railway rates for homeseekers.
- ☐ Business and industrial opportunities in Western Canada.
- ☐ Town lots in growing Western towns.

My name .....

Address .....

Town ..... State.....



onds before the war up to fifty and sixty cents per pound, while the market itself is extremely large with a continued strong demand. Practically the entire crop of the United States is grown on the Pacific Coast, in Oregon and Washington, with the demand for the nuts growing far more rapidly than the production. As with some other crops, it is often a wise plan for the grower to hold the crop for a short time after it is ready for market. As a rule, the market price of the crop invariably drops when the new crop comes in in the fall, only to soar again as soon as it is disposed of. Then, too, still better prices are obtainable by the growers pooling their crops and thus marketing a large product as a unit. Good opportunities for making money in this manner are likewise open to the several growers in the unit in the coöperative buying of supplies which can often be secured in this way at considerable discount.

In conclusion, the author might add that the amount of available material dealing with walnut culture in this section has proven a distinct surprise to him and undoubtedly a marked hindrance to people who have become interested in the industry. The future lying in the development of nut culture in Oregon is ready cause for research work and practical experiments, especially as regards such matters as the effects of cross-pollination of varieties in the orchard, the effects of bleaching, the use of fillers in the walnut orchard, and the possibilities of further improvement of varieties.

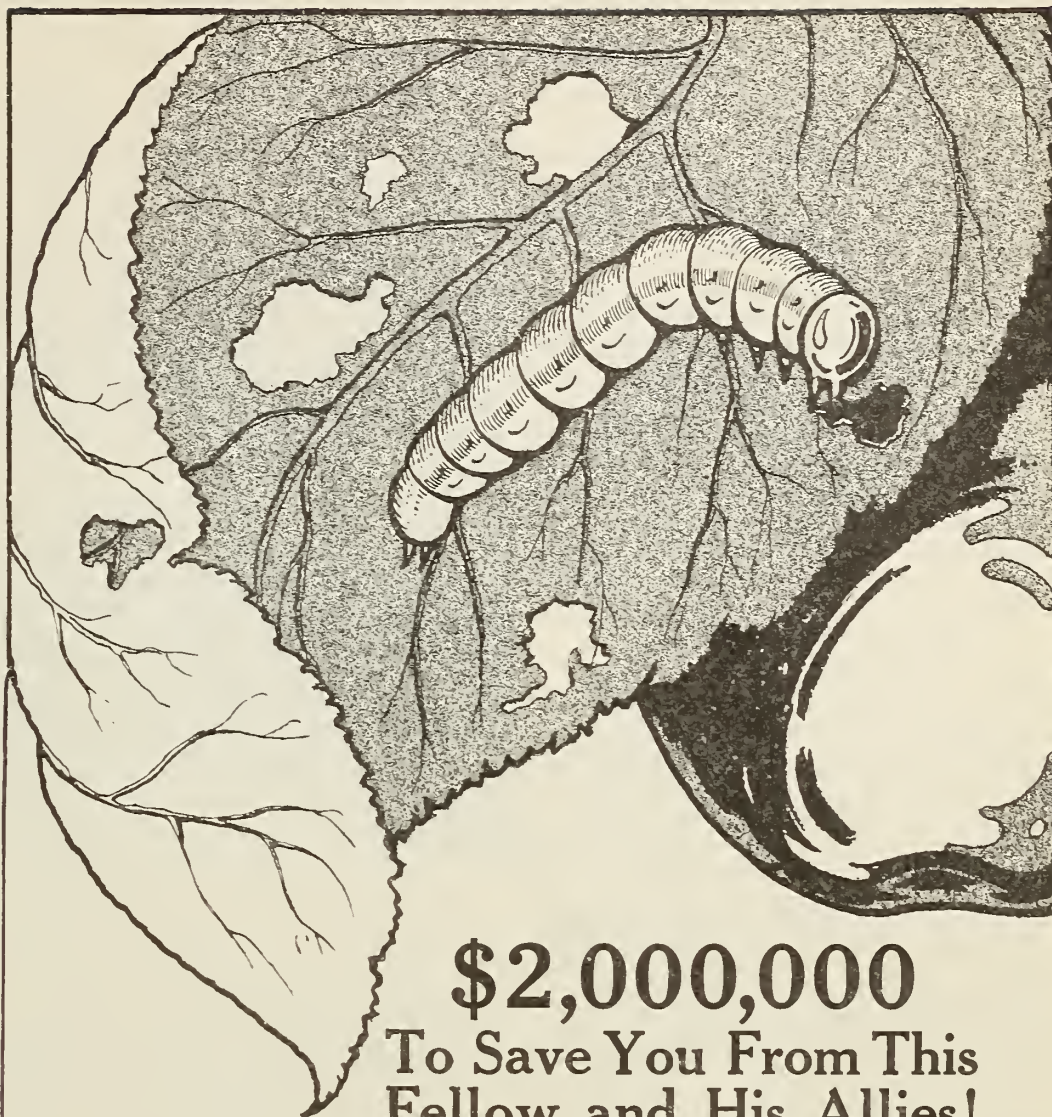
Today the walnut industry is still comparatively in its infancy in this state, and although it is often humorously referred to as "an inheritance bequeathed to the next generation," it is never too late to set out an orchard and enter into an industry that rapidly promises to become one of Oregon's greatest and to converting the Willamette Valley of Oregon into the "walnut section" of the United States.

#### Tagging Trees

Linen cloth is being used in some of the experimental work of the United States Department of Agriculture for tagging trees and has been found to be successful. The linen tags are first soaked several days in water to remove the sizings and then dried and smoothed with a hot iron. Data is written in, with India ink, with a round pointed pen. The ink soaks in but does not run. Tags of this kind will last a year. When they are to be used for a longer period they are coated with paraffin after being labelled.

#### To Advertise Raisins Extensively

The California Associated Raisin advertising for this spring, according to Judicious Advertising will have a total combined circulation in the national magazines of 28,000,000. The advertising will contain suggestions to housewives of the varied uses for Sun-Maid Raisins.



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## Recommendations for Winter-Injured Trees

By W. S. Brown, Chief of the Division of Horticulture, Oregon Agriculture College

**T**HE damage that resulted to Oregon orchards during the middle of December from widespread low temperatures was rather spotted in its severity, some locations not suffering as much as the extreme cold would seem to indicate.

The most serious damage seems to be in the region of the tree immediately above the snow line, taking in the upper part of the trunk and the main limbs. It is indicated by a discoloring of the bark, the cambium layer and in some instances, the outer part of the wood. The tender growing point and sometimes the entire inside portion of the fruit spur may be affected. Combined with this bark and wood injury many buds are affected, especially on the sweet cherries and pears.

### Cause of Injury.

The chief cause of the injury, which is usually found to extend entirely around the tree, is the combination of low temperature, coupled with the presence of considerable sap in the lower part of the trees at least. Another contributing factor which was very serious was the heat generated on the south and southwest sides of the trees by the sun's reflection on the snow. This caused a drying out of that portion of the bark and an injury much worse in some cases than is found on the north side of the tree.

It is found from this work that there is a great deal of difference in the severity of the injury, due to several causes, among them the condition of the trees at the time of freezing, and the variety and the location of the orchard. All gradations in injury are found.

In a few instances portions of the tree above the snow line are entirely killed, in others the bark and wood is not so seriously hurt but that it will probably recover, though the crop will not set for next year. In other cases some of the limbs of the tree, especially those on the south and southwest side may be killed and the rest of the tree may recover. Portions of bark may die on the sides of some limbs, necessitating the cutting off of this bark later and the subsequent painting of the wood, or bridge-grafting, or both.

### Seriousness of Damage.

It is not possible to tell at present just how badly injured the trees are. Shortly after the freeze the division of horticulture of the college station sent out a great number of letters to different growers throughout the state asking them to send samples of injured material to the college. A great many limbs, twigs and buds have been sent in for examination. Some of the twigs containing buds have been placed in the greenhouse in water, to see if they have vitality enough to open the buds and function properly. Tissues from the larger limbs were given careful microscopic examination.

Naturally the question comes up what treatment can we give these trees. The answer is that we can do very little except to give nature as good a chance as possible to recoup herself.

### Pruning Not Advised.

Every fruit grower is wondering what is best to be done about pruning. The horticultural division recommends, after having examined a great many

samples of injury and after several members of its staff have visited injured orchards in widely different parts of the state, that little or no pruning be practiced at this time. It will be better to leave the trees unpruned until April or May, and then notice the conditions of the individual trees before pruning. The reasonableness of this course is apparent when it is considered that some of the limbs that might be pruned out at this time may be needed next spring to take up the growth of the tree, especially if the other branches have been injured. Beside this fact the uninjured buds in the top of the tree are needed to pull up the sap to the tops of the twigs and limbs in the early spring. The more of these buds that are cut off, the less will be the pulling power. If this sap can be brought up to all parts of the tree, it will prevent the tree from drying out and will give the cambium a much better chance to recover.

Then, of course, there is the question of expense. If the tree has been killed by the freeze, it is only throwing away money to prune it at this time, especially when such pruning can do no good. Further, large cuts that are made by removing branches of good size in the trees expose considerable tissue to drying out at this time and therefore injure the circulation of the sap.

Pruning would seem permissible only when the trees had been neglected in previous years and had become too dense. In that case a very light thinning out might be permitted at this time if the tree has the appearance of being injured only slightly. If it is very severely injured no pruning should be done. In late spring or early summer, all cuts of any size, from one inch in diameter on up, should be carefully protected with some material such as white lead and raw linseed oil mixed with shellac or with a Bordeaux paste. In many respects the Bordeaux is the best as it keeps fungi from entering at this point.

Just what type of pruning the tree will need in late spring will depend upon the injury it has received. A statement will be issued on this subject by the experiment station horticulturists next spring.

### Decrease in Nitrate Production

A decrease of about 50 per cent occurred in the production of nitrate in Chile during November, 1919, as compared with the corresponding month last year, according to the United States Consul in the Antofagasta. The exports showed a still greater decrease.

Canning and other methods of food preservation are receiving an impetus in all parts of the United States. This means that waste in the products of the farm and orchard will be reduced, wider markets created and the supplying of isolated districts with a greater variety of diet. It should also have an influence in reducing the cost of living.

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## Baled Hay Saves Thousands of Boxes of Apples

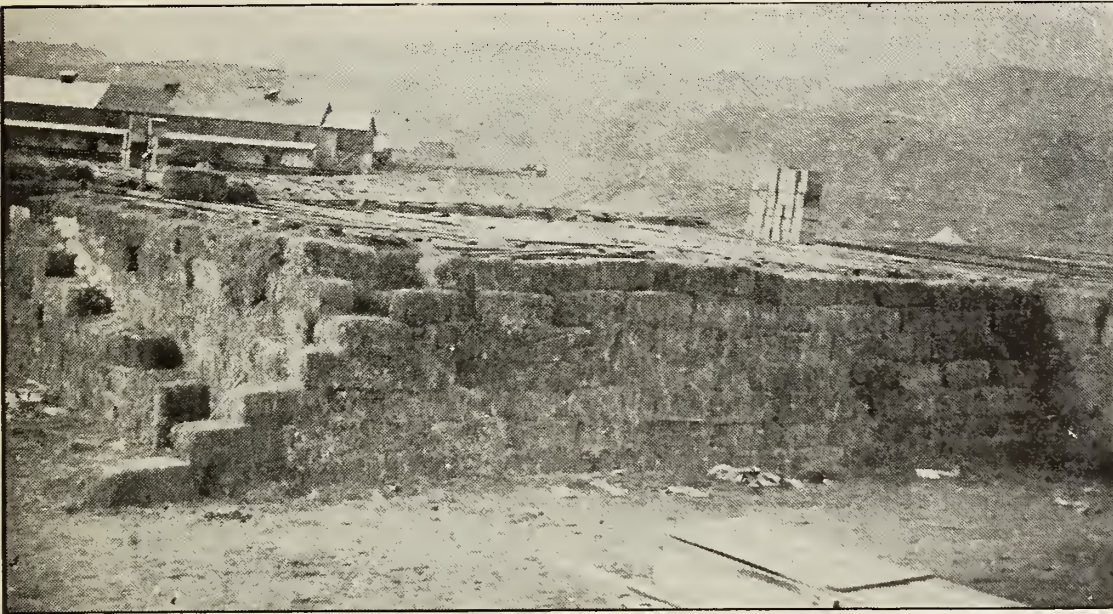
By R. A. Laird

ANY notion that the farmer is less resourceful than the city man does not hold good in the Spokane country.

The Okanogan, Washington, district produces high grade export apples in

of warehouse capacity, facing a heavy cash loss.

Did the farmers throw up their hands in despair? Not for a moment. There was some quick planning, the apples



Apple storage house made of baled hay that saved thousands of boxes of apples in the Okanogan, Washington, district from freezing.

considerable quantities and had a big crop in 1919. Shipping was hampered by a car shortage, and an unexpectedly early cold snap found apple producers with several thousand boxes in excess

were assembled at a convenient point and piled in tiers. Then the owners bought every bale of hay in the district and built a frost proof structure of baled hay around the fruit.

The beauty of the whole matter was that the upward trend of forage prices netted the apple men a handsome profit on the hay after the hastily contrived warehouse was dismantled.

The accompanying picture is reproduced with the permission of the Fox Film Service.

### Peanuts

Most people who eat peanuts, says the American Economist, believe that they are all grown in this country and will be surprised to learn that there were 70,947,036 pounds of these nuts imported during the fiscal year 1918, practically all of which came from China and Japan. Most of the imported peanuts are grown in China. The 1919 crop in that country is estimated at 33,000 tons.

### Many Tractors in Missouri

According to the State crop reporting service, there are now in the state of Missouri 7202 tractors. How rapidly these are being bought and used is best indicated by the fact that nearly half of them have been purchased since the first of June of the present year.

The inspection service for shipments of fruits and vegetables started in 1917 by the Bureau of Markets, United States Department of Agriculture, has been extended to cover 150 designated markets. The certificates issued by inspectors upon request state the condition of interstate shipments as they arrive at market centers and are used as a basis for settling claims that may arise between shipper and consignee.

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# Green Tip Treatment for the Control of Apple Aphids

By W. S. Regan, Agricultural Experiment Station, Amherst, Massachusetts

IN carrying on field experiments for the control of potato plant lice, commercial lime-sulphur solution, among other materials, was tested as to its effectiveness. Although this was used at the rate of one gallon to 22 gallons of water, about twice the ordinary summer strength, and in spite of the fact that every precaution was taken to drench thoroughly all parts of the plants, the percentage of plant lice killed was so small, under ten per cent that it could in no way be considered of value as an aphidicide at a strength safe to use upon potato foliage.

## Object of Comparative Tests

The results of these tests led the writer to question just how effective the usual dormant strength, one to eight, of lime-sulphur would prove against apple aphids when applied at the delayed dormant period, just after the eggs have hatched. With a view to determining this point, a number of tests were carried out. In these experiments commercial lime-sulphur solution was used alone and in combination with nicotine sulphate, and several brands of proprietary miscible oils were also tried out in comparison. Tests were also made to determine the effect of lime-sulphur and miscible oils upon the unhatched eggs.

Remarks might be prefaced here by the statement that the term dormant is taken to mean the condition of the buds in the winter or early spring before they begin to swell. By late dormant is meant the swollen condition of the buds at the time just before they split open, or in other words just before the buds show the least bit of green. This condition would normally be reached during the early part of April in Massachusetts. The term delayed dormant is applied to that period in the development of the cluster buds and foliage when they have expanded from a quarter to a half inch.

It is more or less axiomatic that the hatching of the aphid eggs is about coincident with the first splitting of the apple buds, and that by the time the buds have expanded from a quarter to a half inch, the delayed dormant period, practically all of the eggs have hatched and the young plant lice have migrated to the new growth for food. Observations have confirmed this. Twigs brought in from the field and examined on April 17 had numerous plant lice eggs upon them, but none of these had hatched. The buds were in the late dormant condition. Twigs brought in on April 19 were found to have a few newly hatched individuals, which had migrated to those buds just beginning

to expand and show the least bit of green available for feeding purposes. From the 19th to the 24th of April, newly hatched aphids appeared in increasing numbers. After the latter date only a few new individuals appeared, which could be readily determined by their size. It is evident from this that under favorable weather conditions such as existed during the period mentioned the time of maximum emergence is rather brief. The presence of a few newly hatched individuals on some of the twigs on May 1 indicated that a small number of belated aphids were still hatching from the eggs, but in no case observed had the foliage expanded beyond about half an inch before hatching was completed. No viviparously produced aphids were in evidence at this time.

## Object of Delayed Dormant Spraying

In the past the practice of spraying with lime-sulphur for the control of San Jose scale has been confined for the most part to the dormant or late dormant season. Comparatively recently, however, the practice of delayed dormant spraying with lime-sulphur has been quite generally advocated, based on the assumption that such treatment is fully as effective as dormant or late dormant season applications against the San Jose scale, and that apple plant lice in their active stages would offer less resistance to this insecticide than the unhatched eggs. In other words, it is believed by some that a delayed application of lime-sulphur at full dormant season strength, just after the buds have split open and have expanded perhaps not over half an inch, will control the San Jose scale, and to quite an extent the apple plant lice as well. Applications at this time, practice has shown, can be made with little or no eventual injury to the foliage. Our tests, so far as the efficiency of the delayed applications of lime-sulphur in controlling plant lice is concerned, have by no means borne out this conclusion. From the standpoint of the fungicidal value of lime-sulphur, delayed dormant applications appear to have some advantage over those of the dormant season.

On the other hand it has been recognized by some that only by the addition of nicotine sulphate to the lime-sulphur solution, when this is applied as a delayed dormant spray, can the aphids be satisfactorily controlled. This would indicate that the nicotine sulphate is mainly responsible for the control of the plant lice, and that the only reason for delaying the lime-sulphur treatment and combining it with nicotine sulphate is to make necessary only one application instead of two. Then, too, some advocate the addition of an arsenical to the above combination, at the delayed dormant period, for the control

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of bud moth, case bearers, etc., making possible, theoretically at least, by this insecticide combination the control of San Jose scale, apple aphids and certain foliage feeders by one application.

#### Tests for Destruction of Aphid Eggs

The first tests were made for the purpose of determining the comparative efficiency of lime-sulphur solution and miscible oils against the unhatched aphid eggs. The lime-sulphur was a fresh sample of a commercial concentrate, having a density of 34° Baumé. This was used at the strength recommended upon the container for dormant applications, one to eight. Two proprietary miscible oils were tested, these being diluted one to fifteen, the usual dormant season strength. Although both samples were fresh from the manufacturers, one was evidently imperfect as there was some free oil present. In the tests, however, this imperfect sample showed to less advantage in destroying the eggs than the well-prepared sample, a rather unexpected outcome, perhaps, in view of the presence of free oil. These tests, as in the case of those following in which the aim was to determine the comparative killing efficiency, were carried out in the laboratory, where careful counts could

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be made and results checked. Dipping the infested apple twigs was resorted to rather than spraying, in order to insure uniformity of treatment, as by the latter method any variability of application might lead to an improper interpretation. On examination, shortly after the infested twigs were brought in from the field, it was impossible to make any estimate of the probable number of eggs that would hatch, since a large percentage of the eggs were apparently dead from some cause, as indicated by their shriveled condition. Twigs of as nearly the same size and degree of infestation as possible were selected for insecticide treatment and check, the average length of the twigs being about eight inches. No definite percentage of efficiency can be given for the tests against the eggs. The results should be taken as merely comparative and in the way of a generalization, and are perhaps in need of further verification both in the laboratory and under field conditions. The tests against the unhatched eggs were begun when the buds were in the late dormant condition and at such a short time before hatching occurred that it was impossible to carry out verification checks. The results are given in the following table:

COMPARATIVE EFFICIENCY OF LIME-SULPHUR AND MISCIBLE OILS AGAINST APPLE APHID EGGS IN THE LATE DORMANT PERIOD UNDER LABORATORY CONDITIONS.

Material and Dilution	Hatch on Treated Twigs	Hatch on Check	Injury to Twigs
Lime-sulphur, 1 to 8.....	No hatching on three twigs	Twenty-nine eggs hatched	No injury
Miscible oil A, 1 to 15.....	Thirty-six eggs hatched on three twigs.	Twenty-four eggs hatched	No injury
Miscible oil B, 1 to 15.....	Seven eggs hatched on three twigs.	Fifty-four eggs hatched..	No injury

#### Conclusions

1. The delayed dormant period is usually indicative of the complete hatching of apple aphid eggs. At this time the buds have expanded from a quarter to a half inch.

phur for San Jose scale. The percentage of efficiency will depend mainly upon thoroughness of application.

6. The ordinary dormant season treatment of apple orchards with miscible oil against San Jose scale, if applied thoroughly at the delayed dor-

2. Lime-sulphur solution at full dormant season strength is less than 10 per cent effective against the living aphids when applied at the delayed dormant period.

3. Lime-sulphur applied at the late dormant period, before the buds split open and just before the hatching of the aphid eggs, appears to be highly effective, under favorable conditions, in destroying the eggs, but the elements of thoroughness of application and unfavorable meteorological conditions present such uncertainty as to results that this treatment can hardly be recommended as an effective control.

4. If lime-sulphur is to be used as a control for San Jose scale and no special treatment for apple aphids is to be made later, best results against aphids, if present, are likely to be obtained by a late dormant season application just before the eggs hatch. Treatment at this time should also be thoroughly effective against the scale.

5. The application of the lime-sulphur (one to eight) and nicotine sulphate (one to 800) combination applied at the delayed dormant period gives practically a perfect control for apple aphids and makes unnecessary a separate earlier application of lime-sul-

phur, should result in practically a perfect control of apple aphids also.

7. Delayed dormant applications of full dormant season strength lime-sulphur, lime-sulphur and nicotine sulphate combined, and miscible oils, if perfect, can be made without material injury to apple foliage. Even when the foliage is considerably more advanced, little severe injury usually results. This fact, if taken into account, might make unnecessary separate applications for early and late budding varieties. As the foliage becomes more advanced, however, the success of the treatment involves greater difficulty, since the aphids are very difficult to reach when they have the spreading leaves for protection.

8. The action of lime-sulphur in destroying both the aphid eggs and living insects appears to be mainly mechanical by sticking them to the twigs.

9. The action of nicotine sulphate in killing the living aphids is slow, requiring from about half an hour to twenty-four hours or more for different individuals. Death appears to be due to paralysis.

10. Miscible oils are practically instantaneous in their killing action against the living aphids. The action is probably of a chemical nature.

#### Acknowledgments

The writer is greatly indebted to Mr. A. I. Bourne of the Massachusetts Agricultural Experiment Station staff for assistance in carrying out the insecticide tests, and to Dr. H. T. Fernald for his kind suggestions and assistance.

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## Nails Retard Growth of Cherry Trees

Editor BETTER FRUIT, Portland, Oregon:

I am sending you a photograph of a Lambert cherry tree which has failed to make a satisfactory growth. Out of a planting of one hundred trees sixty or seventy show this same defect in a greater or less degree. The graft was made at the point indicated by the finger. In all the trees which failed to make a satisfactory growth there is a decided contraction in the trunk just above the graft. One tree had an open "sore" at that point and on investigation I found that the graft had been



Nine year old cherry tree showing poor growth and contracted trunk where graft was fastened with brad.

made secure by an iron band. Apparently the brad had been driven into the stock and the scion impaled on the upper end. In the tree just mentioned the effect of the rusting brad was to deaden and blacken the heart wood.

The tree shown in the photograph has been planted nine years and a comparison with the size of the hand shows clearly what a poor growth the tree has made. Every spring the trees would leaf out perfectly and appear all right until the dry weather came on. Then

the leaves would dry up, wither, and fall off. The branches made little if any growth and such fruit as did set did not mature properly. Only about three of the one hundred trees set out have died. I am quite fully convinced that the rusting of the brads, when the stock was small, destroyed the wood to such an extent that the passage of the sap was restricted.

This conclusion is borne out by an experiment I have made. For the purpose of pollinization I grafted onto the branches of quite a number of the trees another variety of cherry. This fact was very evident. On the trees that were growing well the grafts grew well also. On those which were not growing the grafts, though apparently set perfectly, made no growth. Two of the trees which had scarcely made any growth since setting out I cut off below the old graft and made the new graft on the trunk. Both of these made enormous growths compared to the others. This last season a great many of the trees had some very fair fruit on them and they stood the dry season better. I attribute it to the fact that they are getting of such a size that at the point of graft there is sound wood sufficient to protect the ascending sap from the effects of the rusting brads.

GEORGE B. COUPER.

## Advises New Methods in Apple Handling

J. H. Dengal, Wenatchee district manager for G. M. H. Wagner & Sons, who recently returned from an extensive tour of the big eastern apple distributing cities, and who also attended the convention of the National Commission Merchants and Vegetable Shippers, in an interesting interview in the Wenatchee Advance calls attention to some very important phases of the apple industry which developed this year and advises new methods to combat them.

"The apple growing industry," said Mr. Dengal, "is now passing through one of the most critical periods in its history. The present season has been a disastrous one, not only for the shippers at this end, but for receivers at the other. In the first place the eastern distributors paid an abnormally high price for their apples, then the earlier

varieties failed to arrive at a seasonable time, and finally so many of them were frozen when they did arrive that the entire deal has been unsatisfactory and unprofitable.

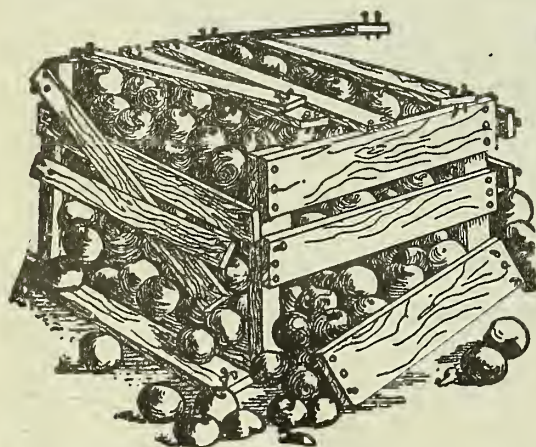
"In order to preserve the box apple industry in the future it is absolutely necessary to secure better transportation, and more adequate warehouse facilities, both here and at eastern distributing points. It is also essential that some method be devised for shipping the various varieties of apples out at the proper season. In other words, Winter Bananas, Jonathans, King Davids and Delicious should all be moved out of the district first, followed by other varieties in seasonable rotation.

"However, there is much consolation to be gained from the fact that the railroads, the shipping and the distributing organizations and many other interests are working together for the purpose of solving these problems. In fact every one connected with the fruit industry seem to be interested in saving the situation except the grower. However, there is reason to believe that the growers will also wake up and take a hand in the game before this season is over.

"A plan is now under way to form a big holding company that will build many thousand refrigerator cars and lease or rent them to the railroads as needed. The railroads are coöperating in every way with this movement. Another big corporation is preparing to erect a large number of cold storage warehouses at producing points as well as in the distributing markets. Both of these plans have advanced to the stage where they seem to be assured."

## Trimming Berry Bushes

If you have not done so, cut out all the old canes of raspberries which bore fruit last year and burn them so as to destroy any diseases and eggs of immature insects that are on them. The old canes if left, will rob the new shoots of much nourishment. When the new shoots reach a height of three and a half inches pinch out or cut off the growing tip to cause the shoots to branch. Cut out also all of the weak shoots, leaving only the strong ones. Blackberry bushes should be given the same treatment.



BEFORE using Cement Coated Nails

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Our Cement Coated Nails are always of uniform length, gauge, head and count. Especially adapted to the manufacture of fruit boxes and crates. In brief, they are the Best on the Market.

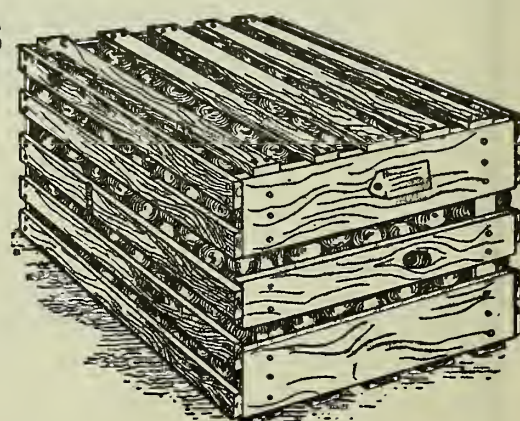
Write for Growers' testimonials.

**Colorado Fuel & Iron Co.**

DENVER, COLORADO

Pacific Coast Sales Offices

Portland, Spokane, San Francisco  
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AFTER use of C. F. & I. Co.'s Cement Coated Nails



## Timely Topics and Advice for the Fruitgrower

The high cost of copper, which is an essential ingredient of bordeaux mixture has led the Bureau of Entomology and Chemistry of the United States Department of Agriculture to experiments to determine whether a bordeaux mixture can not be prepared which will not be more effective for each unit of copper present than as usually prepared, thus resulting in a saving of this expensive constituent of this mixture. Studies will also be made of the manufacture of Paris green, lead arsenate and other compounds of arsenic. No systematic studies of all the compounds of arsenic that might be useful in spraying have been made and it is thought probable that such a study will lead either to the development of cheaper sprays, because the constituent elements are cheaper or to sprays that are more effective than the sprays now used.

Grapes should be pruned during the dormant season, but early enough in the spring to avoid bleeding, this is before the sap rises sufficiently to flow from the wounds. A common hand pruning shears is good for the work.

Prof. H. P. Barss, Plant Pathologist of the Oregon State Experiment Station advocates the pruning of fruit trees to aid disease control and to accomplish this says that fruit trees should be pruned so as to let light and air into the interior of the trees when in foliage. This can be accomplished by a judicious thinning out. Merc heading back will tend to promote a dense crown of foliage which will exclude light and prevent rapid air circulation within the tree, so necessary from a production standpoint but also to assist in keeping down many infections in such diseases, as scab, brown rot, or leaf spot diseases. These troubles come from spores that require the continued presence of moisture on the surface of leaves or fruit to germinate and infect. Open pruning tends to promote rapid drying off within the trees and makes it more difficult for the spores to start.

Anthrachnose of cane fruits, such as raspberries, blackberries, loganberries, etc., which prevents the plants from sending out fruiting branches except at the top, appears in chocolate brown spots on the new canes and spreads and kills the buds. To control this disease the new canes should be sprayed when about 16 or 18 inches high with bordeaux mixture 3-3-50; again about two weeks later and once more before picking time, this last spray to be applied usually between May 20 and June 15.

In commenting on the inoculation of leguminous seeds Ethelbert Johnson, Technical Assistant, Division of Plant Industry, of the California State Department of Agriculture says that a frequent assertion is that inoculated seed will give far greater yields than ordinary seed. Under certain conditions this is true. All legumines are capable of harboring on their roots certain organisms which have the power to utilize nitrogen from the air transforming it into a form available to the plant. As nitrogen is a valuable plant food, and one in which soils are generally deficient, a legume will make a much larger growth when these organisms are present, and because of the added supply of available nitrogen in the soil, the crop following the leguminous crop will be benefited. Moreover, when the soil is low in available nitrogen, if the proper organisms are not present in the soil, it will usually be necessary to introduce the organisms in order to get the legume well started. If inoculated seed, therefore, is planted in soil in which the bacteria are not present, it will undoubtedly make a better growth than seed not inoculated. If, however, the bacteria were already present in the soil, the growth would be the same whether the seed were inoculated or not.

W. H. Wicks, director of the Idaho Bureau of Plant Industry in an article in the Weekly Markets Bulletin remarks that pruning should be begun in time to have it well finished before any spraying is done. It is a loss of labor and material to spray wood which is later to be removed, and, above all, the most thorough spraying is not done on trees improperly pruned. In large projects it is necessary to start pruning in late fall and continue at all times when the wood is not frozen, in order to finish before the first spray is applied.

Whenever the limb of a tree is blown off or becomes diseased, the stump should be sawed off even and painted with creosote or tar paint; otherwise decay will set in and spread to other parts of the tree. Oftentimes even a

nail hole will so injure the bark that it will come off leaving the wood underneath unprotected. If these spots are left bare, decay will set in and seriously endanger the tree. A coat of creosote or tar paint will prevent spread of decay and gradually the bark will grow over the bare place again.

The fruit of plums, prunes and cherries is subject to brown rot. This spreads from fruit to fruit in the tree and often becomes very destructive, especially to prunes. The color of this rot is distinctly brown and affected fruits are soon covered with a dusty dark grayish powder which is a mass of the spores causing the disease. Effective treatment for brown rot consists in spraying with bordeaux mixture 4-4-50 or self-boiled lime and sulphur 8-8-50 as follows: 1. Just before the blossoms open. 2. Just after the petals fall. 3. About two weeks later and again about a month before the fruit is ripe, omitting the last spray for cherries. A very beneficial practice also is to pick off all rotting fruit as it appears and later to pick off all the dried up fruit which remains clinging to the tree and burn it. Plowing the ground around the trees just before they blossom will destroy the fruiting stage of the fungus which grows out of the old fruit on the ground at that time.

To save apples for the market that have not been too badly frozen they should be covered with some material that will keep the air away from them and allowed to thaw slowly. Be careful to avoid handling them while they are in the process of thawing. The best method is to place the apples where the temperature is cold, but below the freezing point and then covering them over with some material that will exclude the air as much as possible.

### Skookum Association Plans New Methods

As the result of a three days' meeting of the Skookum Packers' Association held at Seattle during the latter part of February to discuss better methods of marketing Northwest apples, it is stated that Washington orchardists will endeavor to secure the use of the Crown storage spaces, which will give control and housing of 60 per cent of the state's apple crop and regulate the returns to

growers. To bring this about the executive committee of the Skookum Association was directed by a vote taken at the meeting to open negotiations and report.

Changes that it is expected will be beneficial to apple marketing operations were brought to the attention of the Washington growers after listening to an address on the subject made by Aaron Sapiro, attorney for a number of coöperative fruit marketing associations in California.

Other measures contemplated after listening to Mr. Sapiro will include the building or lease of a central cold storage plant from which the apples will be shipped from time to time when the demand in the Eastern markets is favorable.

Among those who spoke at the meeting were A. R. Rule, vice president and general manager of the North American Fruit Exchange, W. F. Gwin, general manager of the Northwestern Fruit Exchange, and J. Curtis Robinson, traffic manager of the Northwestern Fruit Exchange. Mr. Rule, in his talk on coöperation, said that there were just as shrewd business men running orchards as were to be found in the marts of trade, but that the orchardist naturally centered all his energies on production, and that he must be aided by skilled selling agencies to market his product for him. This he said could be done at a small per capita expense through coöperative organizations.

Mr. Robinson, in showing how the shipments of Northwest apples were increasing, reported the shipment of 27,083 cars of apples from this district this season, as against 70,795 cars in the entire United States. This, he stated, shows an increase from the Yakima Valley of 32 per cent and from Wenatchee of 17 per cent over the preceding year.

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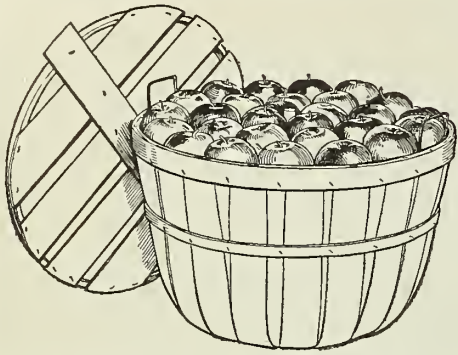
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## Universal Bushel Shipping Packages

Every day in the year the **Universal Bushel Shipping Package** guarantees the grower that his fruit and produce will reach the market in a splendid condition — bringing the highest price.

The sturdy center post running from bottom to cover in the **Universal Bushel Shipping Package** permits fruits and vegetables to be stacked in cars, trucks, or cold storage houses, without injury to contents.

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## What They're Doing in California

The plant introduction station of the United States Department of Agriculture at Chico is engaged in sending out 225,000 plants, shrubs, and trees of all kinds to nurserymen and other agriculturalists interested throughout the country. These plants have been gathered from all parts of the globe and propagated at the Chico station. They are now being sent out for trial to other parts of the country. No charge is made for these plants but the Chico station sends them out only on orders from the Department of Agriculture at Washington, D. C.

There are 15,000 tractors operating on California farms, according to L. J. Fletcher of the California Tractor and Implement Association. They have displaced 150,000 horses, he estimates.

Many young fruit trees are being set out in El Dorado County, principally Bartlett pears, prunes, plums, apples and peaches. Three water users' associations have been organized in El Dorado County for the purpose of securing better service from ditch companies. A big output of box shoo and lumber is expected from this county this year. The lumber enterprises are getting their plants into shape. One firm, putting out box shoo, has bought 1000 acres of pine timber on Plum Creek.

A project has been evolved to make use of the abandoned road houses which line the main highways throughout California and to turn them into fruit stands where ranchers can place their products on display to be sold to motorists who pass the places where they formerly stopped for liquid refreshments. The plan will be taken up at once by the automobile association and steps will be made to interest the ranchers in the project. At many places already the children of the ranchers may be found lining many of the highways peddling fruits and flowers to autoists.

Thirty-five dollars per ton is the price being offered for the coming season's wine grapes, in portions of the Sacramento Valley. It is planned to dry the grapes.

The value of 1919 soil and oil production for Orange County just compiled totals \$77,152,500. The Orange County walnut crop just harvested totals \$5,750,000 in value; the orange crop (90 per cent Valencias) represents a value of \$12,000,000 for 1919 and the lemon crop was worth \$3,500,000.

Fig growers of California are the latest to take steps toward perfecting a cooperative marketing association. The proposed organization will include growers who ship both dried and fresh figs and will embrace all sections of the state where figs are grown. The headquarters of the organization will be at Fresno.

The dried persimmon is the newest dried fruit to be commercially packed in California. After experiments lasting three years a process for drying persimmons has been perfected and they will be put on the market for the first time this year. The fruit is dried without additional sugar and when thoroughly processed is said to have the combined flavor of the date and the fig.

Raisin growers of California are jubilant over the success attained during the past year in drying raisins by the dehydrating process. They now feel that the safety of the raisin crop no longer depends on the weather. During the past year raisins that were only partly dried before the early rains came were taken to dehydrators and turned out as the finished product, without loss in quality.

## Bits About Fruit, Fruitmen and Fruit Growing

Among the fruitmen from the Northwest who were in attendance at the meeting of the Western Fruit Jobbers at San Francisco were W. E. Nelson of the Wenatchee Northern Warehouse Company, D. L. Oliver, of the Clarke-Oliver Apple Company of Wenatchee, Washington, W. F. Gwinn, J. Curtis Robinson and J. B. Adams of the Northwestern Fruit Exchange of Seattle, C. W. McCullagh, sales manager of the Hood River Apple Growers' Association and R. H. C. Wood of Portland. Mr. Wood reported on his return that dealers were of the opinion that the price of apples must come down before they can be moved to the best advantage of both grower and dealer.

During the past month advices from the East were to the effect that the fall in foreign exchange has greatly reduced the export shipments of dried fruits. Should this situation continue long it is expected that the reduction in foreign shipments will affect prices very materially for domestic consumption. With the exception of raisins the market for other dried fruits such as prunes, peaches, pears and apples is reported dull.

As a result of the quarantine established on foreign nursery stock by the United States Agricultural Department the amount of stock requiring inspection by state officials has been greatly decreased. Action recently taken by the department is expected to further extend the quarantine, making the shipments still more limited.

Clinging to his faith in the Ben Davis apple, Louis Erb, one of the largest growers in the Ozark district of Missouri, says that notwithstanding the opinion of an unthinking public, this apple is just as good as it used to be. He opines that the Ben Davis has been decried by all sorts of people who don't know a good apple when they see it or taste it and that it will hold its own with other varieties in the future. In winding up his eulogy of this much abused apple Mr. Erb states flat-footedly that no matter what may be the case elsewhere the Ben Davis is the best variety to grow in Missouri.

Replying to a recent rumor that the selling agency of the Oregon Growers' Cooperative Association was to be assigned to the Northwestern Fruit Exchange, C. I. Lewis, organization manager of the growers' association emphatically denied that such was the case and asserts that the organization will have its own sales force and will sell its output under its own brands and through its own connections. Mr. Lewis stated that Robert C. Paulus, sales manager of the organization at the time the rumor was afloat was in the East, making selling connections and that the entire force was engaged in working out the original policy of the organization to harvest, store or ship and sell all the products that would be handled by the association under brands that would make Oregon fruits a household word everywhere.

The national prohibition law, which makes the sale of fruit juices containing more than one-half of one per cent alcohol unlawful, it is feared will deal a death blow to the cider making industry which flourished this year as never before and resulted in securing for growers a much higher price for their cull apples. Managers of cider making plants state that unless the law is modified, cider such as the public wants to drink cannot be manufactured. Due to the fact that prohibition stimulated the consumption of cider greatly, it is figured that 60 per cent of the 1919 cull apple crops in many orchard districts were utilized in making this beverage.

H. F. Davidson of Hood River, an extensive grower and handler of Northwest apples, calls attention to the fact that one of the most serious things confronting the sale of Pacific Coast apples is that cars which are being used in connection with a heater service have a style of heater that is generating a gas that gives the apples an unpleasant flavor. He says that many consumers of Northwest apples are complaining of the apples being flavored with coal oil smoke and are discriminating against them in favor of Eastern fruit. He advocates that either the heater service must be changed or some other method provided for transporting Pacific Coast apples so that they will arrive at their destination in the best condition. The car shortage he emphasizes has resulted in a loss to growers and shippers of such a large sum that it would be sufficient to construct a large number of refrigerator cars. As a result of this shortage Northwest apples were very much delayed in getting into consumption and consumers resorted to other fruits.

Robert L. Ringer, for three years in charge of the Portland office of the United States Bureau of Markets, recently resigned to accept a position with the Federal Farm Loan Bank as farm loan appraiser in the Oregon district. As head of the Portland office of the Bureau of Markets Mr. Ringer rendered efficient service to the fruit growers and shippers of the Northwest and his retirement is to be regretted as is also the announcement that the service is to be discontinued in this district.



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## Fruit Box Supply for 1920

Continued from page 14.

The meeting also discussed standard packages and the necessity for establishing a shock tariff to include specifications for all packages, standard and uniform footage for these packages with a view of bringing the manufacturers to a uniform basis in figuring stock required for production. It was found that various manufacturers in figuring the same box have varied as much as 10 per cent in their footage computation. It was decided to refer the matter of uniform footage to the separate associations.

## Bees and Beekeeping

Next to disease in the colony, cold cellars are the biggest single cause of loss to beekeepers in climates that have cold winters according to H. F. Wilson, in charge of the Wisconsin Experiment Station Apiary. Too rapid use of stores, dysentery and mold on the combs may all result from a cold cellar. Cold cellars are always damp ones, because, as the temperature in the cellar falls, the bees produce more heat and the temperature in the cluster rises, more moisture being given off. This is especially true when the cellar temperature is as low as freezing. The production of more heat not only uses up more stores but, if the stores are bad, the amount of refuse matter in the intestines of the bees is so increased that dysentery may result. The cold,

damp air causes moisture to collect in the hive and not only makes life miserable for the bees but develops mold on the combs and creates a general bad condition. Whether or not bees winter best in cellars makes little difference just now, according to Mr. Wilson. The point is that a poor cellar is almost as bad as none at all, and in some cases it is worse. In order to get the proper temperature around the cluster, 57 degrees or a little above, the bee cellar should be kept at a constant temperature of about 50 degrees. Any temperature below 40 degrees is too low and if the cellar is cold enough to permit frost on the walls the winter loss is greatly increased. Ventilation in the bee cellar is important only as it regulates the temperature, says Mr. Wilson. When bees come out of the hive and fly around it is likely to be due to either light or dysentery, certainly not to need of air. In fact, bees winter best in cellars where ventilation is provided only when the temperature rises above 55 degrees.

According to bee experts, bees, buckwheat and berries, with clover and cows on the side, are the three best bets for the fruit grower or farmer on light, sandy soils. Strawberries, raspberries, blackberries, clover blossoms and buckwheat are advocated for the bees and the market. The clover hay can be fed to the cows, while the clover seed and buckwheat can also be marketed.

Boys' and girls' bee clubs under the direction of a beekeeper as teacher are now being advocated in the public schools. The first club of this kind was organized recently in Wisconsin. The club now has eleven members, each of whom has from one to five colonies of bees. A prize will be offered for the best production of honey and care of the bees.

Mary had a swarm of bees,  
Who just to save their lives,  
Went everywhere that Mary went,  
Because she had the hives.  
—American Bee Journal.

One hundred and thirty-five colonies of bees with an average production of 185 pounds of honey to the colony was the record reported by John Heilman of Oak Point, Washington, from his apiary last year. Other yields reported by beekeepers in Washington were 90 pounds per colony. The total amount of honey produced by Mr. Heilman's colonies was 25,000 pounds.

## Cannery Notes

The canned fruit pack of California exceeded that of 1918 by 4,753,676 cases. The number of cases of fruit put up in the state in 1919 were: Apricots, 4,395,204; pears, 1,071,687; freestone peaches, 1,962,700; clingstone peaches 5,096,249; other fruits, 1,170,563. Total, \$13,696,403 cases.

At a meeting recently held at Toppenish, Washington, attended by representatives of the Libby, McNeil & Libby canning plant and fifty farmers, the canning company discussed a proposal to increase the growing of cucumbers and spinach on the reservation. The company promised that if the farmers would increase the planting of these vegetables 75 to 100 acres that it would install a salting plant on the reservation.

A report from Chehalis, Washington, says that the Chehalis cannery of the Lewis County Canning Association will continue to be operated as an independent organization as originally planned, according to action recently taken. Dan W. Bush, who has been at the head of the local organization since it was founded in 1915, has worked out a plan whereby a number of the leading business men of the city have associated themselves with him in the project, and additional capital will be provided to give it ample financial backing. C. L. Brown, Dr. J. T. Coleman, M. S. Burnett, A. C. St. John, H. C. Coffman, L. H. Sticklin, T. R. Behrend, H. L. Petit, J. M. Sleicher, A. E. Pollock and Hans Johnson, in addition to Mr. Bush and Carl V. Huber, will be heavily interested in the new plans, it is stated.

The gross sales of the canneries operated by the Eugene Fruitgrowers' Association at Roseburg, Oregon, in 1919, amounted to \$889,556.24, and the total number of cases of canned goods put up was 80,576. Fresh fruit totalling 32,944 boxes was sold; 266,465 boxes were manufactured by the box factory and 25,000 gallons of vinegar made by the vinegar plant. The total amount of fruit and vegetables canned and dried by the association was 6,507,391 pounds.

Although the canning and processing plant erected at Sutherlin, Oregon, last year was believed to be large enough to handle the output of that district for some time, Frank J. Norton, manager of the Sutherlin Fruit Products Company, announces that it is too small for the developing business. The result is that the directors of the company have just authorized the building of an additional structure that will be 60x100 feet, which will provide more space for the cannery and also additional room for another drier.

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We now have three new colors—pink, yellow and scarlet, as well as crimson. All these colors mixed. **20 cts. per pkt.**

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**Giant Centaurea**, superb for garden or vases.

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**Big Catalog**, free. All flower and vegetable seeds, bulbs, plants and new berries. We grow the finest Gladioli, Dahlias, Cannas, Irises, Peonies, Perennials, Shrubs, Vines, Ferns, Peas, Asters, Pansies, etc. All special prize strains, and many sterling novelties.

**JOHN LEWIS CHILDS, Inc.** Floral Park, N.Y.



## Cultivating the Prune Tree

Continued from page 12.

prunes, are borne only on vigorous trees. In analyzing the wood of a typical prune tree, from 12 to 15 years of age this condition is generally found:

"First—There are a number of water-sproutlike growths, or vigorous shoots springing from the main branches. Thus, these growths are always upright. This wood has a wonderful future.

"Second—There is a great deal of wood in the tree which grows out more or less horizontally, or is beginning to droop slightly. This wood has a wonderful past and a fair present, but has no future.

"Third—The remaining wood of the tree is a mass of drooping branches, crooked and weak, which analysis shows, has no present, and no future, but a wonderful past.

"In pruning our trees, we should encourage the new waterspout-like growths, by removing the wood near them, so that the long shoots can develop. Head back these long shoots, so that they will force out new laterals. In this way we are renewing the tree every few years, and this renewed wood will produce lots of prunes and big prunes. Wherever the horizontal type of growth interferes with the vertical type, it should be removed. The drooping wood is of little or no use. It should be largely removed. By thinning out from 25 to 50 per cent of it, the remainder can be somewhat re-invigorated and at times made productive.

"One of the quickest and cheapest ways of removing this old wood is to put on old gloves and break out the old wood in that way. One is soon able to tell very quickly by the feeling of the wood and will thus know what to leave and what to take out."

## Quarantining Foreign Fruit Stocks

In order to prevent the entrance of a number of plant diseases and injurious insects from the Orient, the United States Department of Agriculture proposes to prohibit the importation of fruit stocks, cuttings, scions and buds from Asia, Japan, the Philippine Islands and Oceania. The diseases and insects that the department seeks to exclude by the quarantine include Japanese apple cankers, blister blight, and rusts, the Oriental fruit moth, the pear fruit borer, and the apple moth.

## Tractor Demonstration Successful

At a tractor demonstration made at Hood River recently participated in by the agents for the Cletrac and Frageol, both these types of machines made a most creditable showing. The demonstration took place under adverse conditions, the soil being wet and muddy. All the tests, which were severe, were successfully carried through. As a result of the demonstration added interest in the tractor and additional purchases by orchardists are reported from the Hood River district.

When purchasing fertilizers, remember in  
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received the stamp of approval of the U. S. Government, whose agents aided in the direct distribution of this plant food amongst farmers.

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As to the quantity and method of application, consult your County Agricultural Agent or write

## The Nitrate Agencies

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of Spray**

The Hardie Orchard Gun saves your time and muscle--no long, heavy rods to hold.

Turns a big job into a little one. One man with a Hardie Gun will do more work and do it better than two men with the old-fashioned rods.

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Low price made possible by big production—send for the Hardie Catalog today. Hardie Sprayers and spraying devices standard for 18 years.

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you will  
get*

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**E**ACH is important. The crop for this year's income. The trees for your permanent income. You cannot afford to take chances on either.

Our interests are mutual. When you prosper we benefit. It is to our advantage to have you produce plenty of fine fruit.

For many years we have carefully and conscientiously studied fruit and tree pests. Our scientists in the chemical laboratory, and in the fruit orchards, have by research, experiments, tests and demonstrations proved what is necessary to eradicate these troubles.

Our final analyses determine beyond doubt that Orchard Brand Dry Powdered Arsenate of Lead is the surest protection.

There is a carefully prepared booklet dealing with the subject fully and in detail. A copy will be cheerfully sent you upon request.

Other spray materials, for specific purposes, we recommend are:

**Orchard Brand Dry Powdered Arsenate of Lead.**

**Orchard Brand Arsenate of Lead, Standard paste.**

**Orchard Brand Atomic Sulphur (patented).**

**Orchard Brand Bordeaux Mixture paste.**

**Orchard Brand Powdered Bordeaux Mixture.**

**Orchard Brand Lime Sulphur Solution.**

**B T S Dry Sulphur Compound (patented).**

**Orchard Brand Weed Killer.**

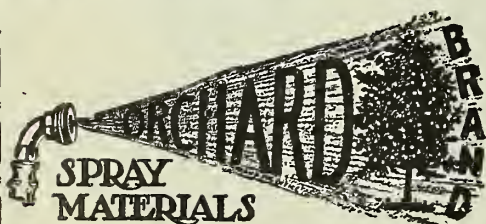
**Universal Brand Dormant Soluble Oil.**

**Universal Brand Miscible Oil.**

**Universal Brand Distillate Oil Emulsion.**

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Our interests are the same as yours. Write us about your tree troubles, and ask for Bulletin No. 3 on Dormant Spraying of Deciduous Fruit Trees.



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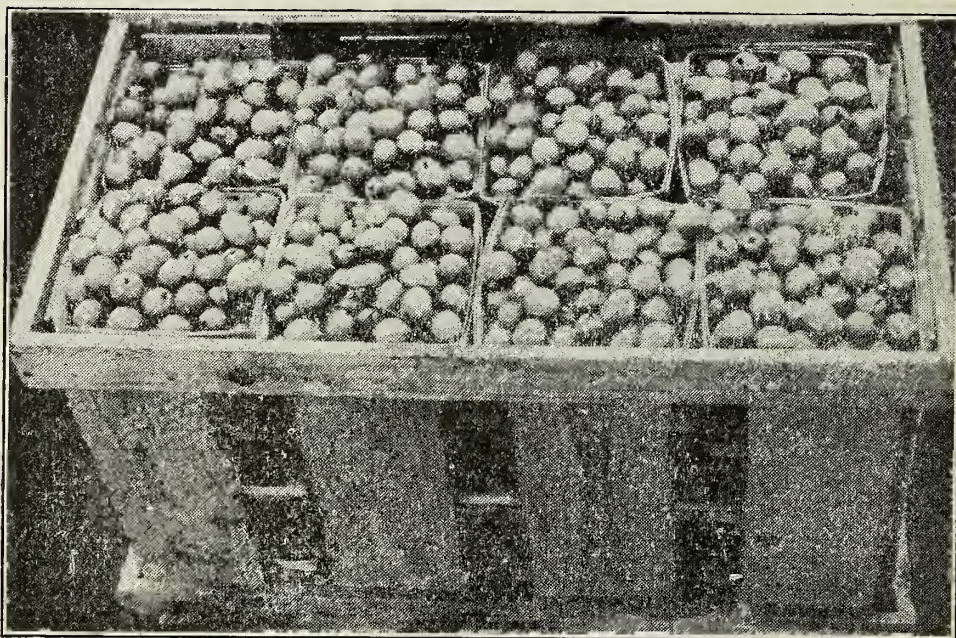
## The Currant and Gooseberry

Continued from page 10.

### Varieties

**Currants**—For commercial plantations, vigorous, erect-growing productive varieties should be chosen. The more acid variety should be selected for jelly making and the milder varieties for dessert uses. The fruit should be large and firm and borne in compact clusters. Deep red varieties are pre-

ferred for the Pacific Coast. The varieties mentioned are only suggestive. In certain localities in the regions specified other varieties may be better adapted. The Fay, Perfection Cherry, White Grape, Red Cross and London have been found entirely hardy in North Dakota and should be hardy anywhere in the United States. Most growers prefer to plant one or two varieties. If two varieties are used, an early and a late one are selected.



A 32-quart crate of Columbus gooseberries grown at Middlehope, New York, considered one of the most desirable of the European varieties.

ferred for the market. For dessert use in the home, the white currants are considered the best.

The following varieties are suggested for the sections named: Perfection, Wilder, Red Cross, and White Imperial for the northeastern part of the United States; London (London Market), Wilder, Red Cross and Perfection for Michigan and other parts of the Middle West; Perfection, London (London Market), Wilder, Red Cross, Fay and Vic-

### Gooseberries

As already stated the American varieties of gooseberries are usually the most productive, are hardier and are considered by most Americans to be of better quality. The Downing, Oregon and Poorman are considered some of the best American varieties. Some of the best known European varieties which are larger and sell at a higher price than the American varieties are the Chautauqua, Columbus, Portage, Triumph, Industry, and May Duke.



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## Commercial Fertilizers

Continued from page 7.

worked out for each district. If the soil is sour it must first be sweetened by the use of lime. The average careful observing fruit grower will have very little difficulty in determining what will be best for his orchard.

In a general way the following suggestions may be helpful in determining the method and fertilizer to use:

1. The physical condition of the soil must be normal.
2. There must be neither a deficiency nor a surplus of humus for the best results with commercial fertilizers.
3. Commercial fertilizers will not give positive results in very dry or very wet soils.
4. If the trees are making a very strong wood growth the probabilities are that there is a surplus of nitrogen already in the soil and that light applications of potash and phosphoric acid are needed.
5. If the trees are bearing light crops and making short wood growths the probabilities are that there is a shortage of available nitrogen in the soil.
6. If the trees blossom profusely each year and fail to set a crop and the other conditions are favorable, the chances are that there is a shortage of nitrogen in some form.



Cabbage patch fertilized with a well known brand of commercial fertilizer. The yield from this patch is reported at thirty-one tons to the acre.

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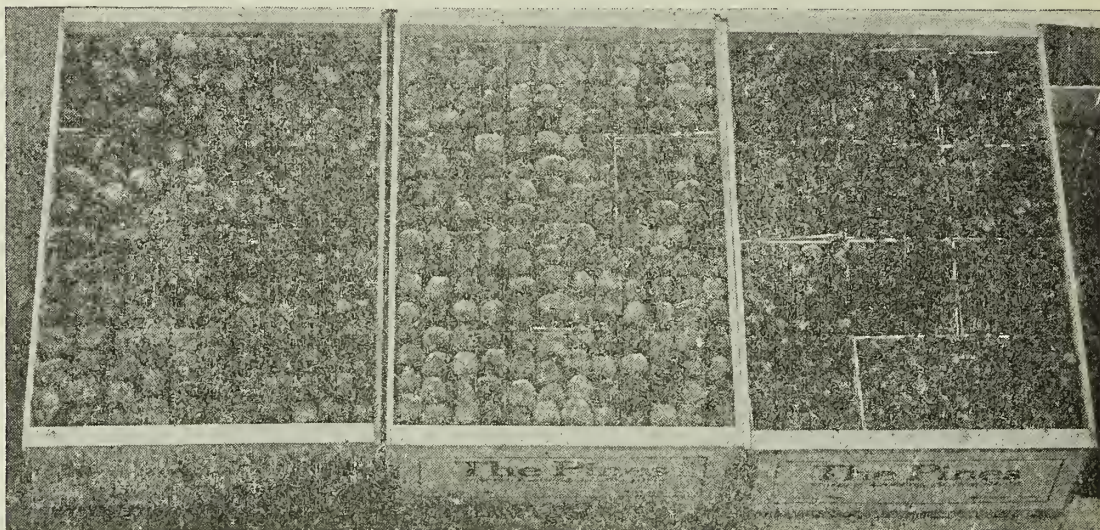
7. The grower must remember however, that commercial fertilizers will not do alone what he has failed to do when using all good orchard practices common to the knowledge of man.

Light applications of nitrate of soda on bearing fruit trees have given extra fine results in many sections of the Northwest. Three to five pounds applied before growth started in the spring in many cases has increased the normal crop from two to ten times the first year and shown good increases the

first time and while it gave very promising results the year was so unfavorable that we are in doubt as to its real merits on our soils, nevertheless the results were so promising that we feel it is very worthy of extended trials.

Blood meal and tankage are excellent fertilizers for all seasons' growth and while not so rapid in action gives excellent results in producing strong long wood growths.

While there is an apparently abundant supply of potash and phosphoric



Strawberries fertilized with nitrate of soda, two hundred pounds to the acre. The feature of these berries is their very large size. In tests made at Hood River, Oregon, it was found that nitrate properly applied produced a larger yield and much larger berries.

second and third years. In addition to increasing the yields it has tended to increase the size and color of the fruit very materially. While we normally expected an increase in size we did not expect better color.

The trees showed increase in vigor and gave every evidence of strong response to the fertilizer.

Light applications on garden crops grown for foliage like lettuce, cabbage and spinach gave excellent returns.

With nitrate of soda at less than four cents per pound it is a splendid investment and one that the average fruit man and gardener cannot afford to pass up during these years of high prices of farm produce.

Sulphate of ammonia was tested out in our own orchards last year for the

acid in our soils, in a few instances light applications of these plant foods has apparently improved the quality and color of certain fruit crops; however, very little is known as yet as to their real merits on our soils.

Sulphur or gypsum may be used to advantage on leguminous crops and especially alfalfa and peas when used as cover crops in the orchard where a very heavy green growth is desired. The demonstrations with these fertilizers have given very striking results even on land that was considered rather dry.

All the results that are available at the present time indicate that commercial fertilizers can be profitably used in varying degree by a large proportion of fruit men and gardeners.

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## Northwest Fruit Notes from Here and There

### OREGON

D. F. Fisher, plant pathologist and C. A. Reed, nut expert, both of whom are connected with the United States Agricultural Department report that damage to orchards and fruits generally in Marion County from cold weather is not as great as first thought and that in most instances the trees harmed will recover during the next few months. Mr. Fisher and Mr. Reed will spend two months in examining orchards in various parts of the state.

An unofficial report from Marion County is to the effect that loganberry growers there have been offered 10 cents a pound on contract for their fruit for the coming season. Few of these contracts it is said are being signed as growers expect an unprecedented demand for these berries this year. One large grower is reported to have set the price for his loganberries at 15 cents per pound and states that he will not dispose of them for less.

Shortage of water to irrigate the rapidly increasing fruit crops in the Ashland district is called attention to in the Ashland Tidings, which says that there should be no further planting in that district until growers are assured of sufficient irrigation to mature their crops. A conference of fruit growers in that district has been planned to discuss the situation with a view to taking steps to secure a larger supply of water for irrigation.

The capital stock of the Eugene Fruit Growers' Association was recently increased from \$100,000 to \$250,000 at a meeting of the stockholders. The association, which operates a large fruit packing warehouse, a cannery, vinegar factory, ice plant, box factory, fruit evaporator, and ice cream making plant in Eugene, has besides canneries at Junction City and Creswell. It has 781 stockholders and did a business during the past year of \$949,475.73.

A further examination of Hood River orchards by Leroy Childs, chief of the experiment station at Hood River, and Gordon C. Brown, horticulturist of this institution, for frost damage is reported to show that with the exception of a few isolated spots in the valley the damage will be slight in that district. Or-

chards in damp spots are said to have suffered severely and will need heavy pruning. This treatment, however, will not be applied until late in the spring, when a full opportunity will be given to learn exactly how serious the damage is.

The financial report made at a recent meeting of the Fruitgrowers' Union of Freewater, showed the largest profit in the history of the organization. The tonnage handled by the organization during the past year was the largest in five years. The members of the new board of directors are O. K. Goodman, Fred Elfert, L. A. Reihaman, Gleason B. Clark, A. Coffin, Herbert Tanks and Miss Minnie Kicker. Stanley Armstrong, who has been very successful in the management of the organization, was again selected for this position.

The recent shipment of a carload of Spitzenberg and Newtown apples by the Umpqua Valley Fruit Union located at Roseburg, marks the beginning of a considerable output of apples from this section of Oregon. The shipment came from the orchard of F. P. Wilbur, one of the many good sized orchards that are now coming into bearing in this district.

Blackberry vines in the Albany district are reported to have come through the heavy freeze with little injury and to be putting out buds. Even runners that were supposed to be dead are showing signs of life and a fairly normal crop of this fruit is expected in this district this year.

Jackson County fruit growers, numbering 106, and controlling 4,251 acres of orchards, recently joined the Oregon Growers' Cooperative Association at a meeting held at Medford. The enrollment followed talks made by C. I. Lewis and M. O. Evans, representing the association. A large part of the acreage signed up is in the Gold Hill and Talent section. A committee of representative orchardists was elected at the meeting to represent the association locally and to carry on the extension work of the organization.

Observations made in the Rogue River Valley to determine the amount of frost damage sustained in that section, by C. C. Cate, county

plant pathologist, and Prof. Reimer of the Southern Oregon Experiment Station, lead to the statement that the damage was light and that the situation is very encouraging. Many sections of the valley are reported as not damaged at all. In a few orchards Bosc pears were found to have received more or less injury. Careful attention and a good growing season, however, are expected to restore the damaged trees to their normal condition.

The large acreage of apple orchards in the Sutherlin district is now coming into bearing and shipments from this section will total a large tonnage in the near future. The largest tract in the Sutherlin country was set out a number of years ago by Mr. Luse. Originally it comprised several thousand acres set to standard varieties but has since been split up into smaller tracts. The site selected for this large planting was carefully chosen and good care has resulted in an excellent development. While most of this acreage is in apples a part of it is set to prunes.

According to W. E. Schimpff, manager of the Oregon Cranberry Association, Oregon and Washington growers are looking forward to a good output of this fruit this season. Cold weather resulted in no damage to the plants, most of the bogs being covered with snow while those that were not, were flooded to protect them. The condition of the terminal buds at the present time is said to indicate that a good crop can be expected in the Pacific Coast district this year.

Prospects for the prune crop in the Willamette Valley this year are reported good with the exception of defective trees that did not

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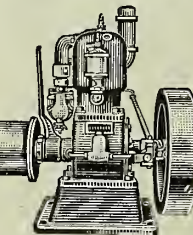
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survive the December freeze. The number of these trees, however, is reported as negligible. Even in frost susceptible districts the buds were found to be about as hardy as the sapwood, both of which were found to be but little injured.

#### WASHINGTON

The Selah Fruit Growers, Inc., with a membership of 250 growers has taken over the big cold storage plant formerly operated by the Selah Fruit & Cold Storage Company. The plant has a capacity of 225 cars of cold and 25 cars of common storage and will be under the supervision of S. M. McKee, president of the growers' association. It is modernly equipped, having been built only two years ago. In addition to the recently purchased cold storage plant the organization owns a large warehouse and an evaporator which this season dried 4,000 tons of cull apples.

In a contest that was recently waged in the Yakima Valley to determine the largest returns in that section from one acre of fruit, C. L. Glidden showed a return of \$1,925 from an acre of 12-year-old Bing, Royal Anne and Black Republican cherry trees. In addition to this Mr. Glidden grew \$75 worth of other produce on the same acre. Another claimant for the blue ribbon was Warren F. Flagg, who submitted figures showing that he had sold \$1,703 worth of Winter Nellis pears from a one-acre tract. It was finally agreed, however, that C. A. Westaby, who brought figures showing that he had realized \$1,428 from three-fifths of an acre of Bing and Royal Anne cherries and had sold the cherries loose, eliminating the expense of packing and boxes was entitled to first honors.

The Perham Fruit Co., has announced that it will enter the Grandview fruit field this year and will build a warehouse there unless it is able to lease suitable warehouse space.

E. A. Mansfield, who has leased the warehouse formerly owned by the White Salmon Growers' Association at White Salmon, will enter the strawberry handling field in the mid-Columbia district during the coming season.

The Mt. Adams Farms Co., which has large orchard holdings near Gilmer, Washington, marketed 8,000 boxes of pears last fall that averaged \$2.95 a box. A large quantity of other fruit was also marketed. The company will build two new packing houses this year and install a large amount of new equipment. Five acres will be set out to strawberries this spring.

Young prune and walnut trees in the Washington district are reported to have been severely hit by frost during the winter. The trees that were damaged the most were those that had received intensive cultivation late in the fall and had been kept growing by the fall rains.

A jury at Yakima before whom was tried a suit brought by A. C. Heinie against the Pennington Fruit & Produce Co., to enforce the fulfilling of a contract, split the difference between the contending parties and awarded Heinie damages amounting to \$1,998, one-half the amount sued for. The contention of Heinie was that he had a contract with the produce company to purchase 20,000 boxes of peaches from him at 75 cents a box and that the company refused to fulfill the agreement. Between the time of marketing the fruit and the trial of the suit it was claimed by Heinie that an employee of the produce company had obtained the contract and burned it. The defense of the produce company was that the contract contained an optional cancellation clause.

P. R. Parks of Spokane, general manager of the Skookum Packers' Association, recently returned from a visit to California where he made a study of the operations of the cooperative fruit marketing associations of that state. Mr. Parker is strongly urging the growers of Washington to form similar organizations.

At a recent meeting of the Puyallup & Sumner Fruitgrowers' Association the shareholders adopted a resolution to distribute \$64,000 in profits and accumulated interest. It is expected that the distribution will be in the form of a 10 per cent cash dividend and the balance in stock in the canning company.

The Wapato Fruit & Cold Storage Company recently awarded a contract for the building of an addition to its plant which will be 100x100 feet and will adjoin its present building. The new building will be utilized for packing during the fruit season and for storing boxes and other supplies carried by the

company. It is the intention of the company also to add cold storage to the upper story of their present plant.

The annual convention of the Western Washington Horticultural Association which was held last month was marked by a good attendance and an interesting program. The speakers during the sessions of the convention were M. L. Dean, chief of the Division of Horticulture in the State Department of Agriculture; W. H. Paulhamus and George P. Stuart of Monroe, secretary of the association; J. A. Hays of Tacoma; Prof. R. J. Barnett of the Washington State College; John B. Wiley and Arthur Frank of the Western Washington Experiment Station. Robert T. Reid of Bellevue is president of the association.

In summing up the extent of the frost damage in the Grandview district, District Horticultural Inspector Close says that "cherry

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most satisfactory"

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"My trees planted three years ago in beds blasted with Giant Powder are 75 to 100 per cent bigger and better than the trees that I planted in dug holes," writes H. H. Smith, Oregon City.

**You will enjoy reading "Better Farming with Giant Farm Powders."** It describes all the new and money-saving methods of blasting beds for trees, subsoiling established groves and orchards, clearing land, ditching, etc. Write for it now.

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buds in most cases appear to be killed. I have found, however, many good buds on all the varieties that are common in this district. I do not look for anywhere near a full crop but there will be some cherries. The same holds true for the peach and pear buds. Winter Nellis and Anjou buds do not seem to be hurt any but the Bartlett and Comic buds seem to have suffered as bad as those of the soft fruits. As was pointed out by E. L. Robertson of the extension department at Pullman, the Bartlett tonnage is very apt to be greatly reduced. I believe the grape stock of our native varieties has not been hurt much. European varieties such as the Tokay and Thompson seedless appear to have suffered. Those varieties are not of commercial importance in this Valley."

The Pacific Fruit & Produce Company has commenced excavation for a new fruit and produce warehouse at Wapato that will be 155x200 feet. The building will be a one-story structure with a full basement 12 feet high, and will be constructed either of brick, concrete or tile. The rapidly increasing business of the company at this point made it necessary to secure greatly increased warehouse space.

A meeting of fruit growers was held at Milton, Oregon, at which Fred Benton of Pendleton, agricultural agent of Umatilla County, and Professor H. Weatherspoon, state

fruit inspector of Elgin, organized the East End Umatilla County Farm Bureau, which will embrace the fruit, stock, hay and grain sections adjacent to Milton and Freeewater. The prime object is to eliminate orchard pests.

J. W. Dudley and Sons, managers of the Wenatchee-Stratford Orchard Company, east of Ephrata, estimate their crop of apples for 1918 at 80,000 packed boxes. They have already shipped to market 55 cars and have employed at the orchard from 30 to 78 persons continuously. The 1919 crop has already yielded over \$200,000, with more cars to be shipped.

At the Yakima Horticultural Association's annual meeting, the report of the treasurer, John P. Evans, showed an increase of about 41 per cent in business transacted during the year with about \$2,500,000 returned to growers. During the season 1,532 carloads of fruit were handled; of which 69 remain in Yakima and 39 are in storage in the East. The remainder has been sold. Average prices of fruits, all sizes, grades and varieties were: Apples, \$2.16 a box; pears, \$1.69; peaches, 65 cents; cherries, 15.8 cents per pound. During the fiscal year of the association the old outstanding surplus was distributed in the form of 100 per cent stock dividends with a 20 per cent cash dividend. The capital stock was in-

creased from \$40,000 to \$150,000. Supplies sold to growers through the association amounted to \$204,000. Property holdings total \$155,963. The organization is working on the construction of a cold storage plant at Yakima.

#### IDAHO

W. H. Wicks, director of the Idaho Bureau of Plant Industry publishes the following timely advice in the Idaho Weekly Markets Bulletin:

The time is fast approaching when all fruit growers should begin to consider the essential work of thorough and proper spraying. The necessity of having the pruning finished before any spraying is done has been mentioned in a previous article.

It is impossible to successfully combat insect enemies unless all orchards are thoroughly sprayed, and neglected orchards should be reported to the Bureau of Plant Industry, Department of Agriculture, for compulsory spraying or eradication.

The proper time and thoroughness of all spraying operations are absolutely necessary for success. Spraying for San Jose scale control can be given from now until buds open. Do not depend on summer spraying for this pest. Advantage should be taken of bright spring days without wind when the temperature is above freezing and trees are dormant and not wet. The material to use and time for spraying for other insects will be stated in due season.

Last year much difficulty was experienced by many growers who were unable to secure spray material, particularly lime-sulphur, or who secured it too late for proper use. Arsenate of lead and lime-sulphur will be used in large quantities this year and the wise fruit grower will lay in his supply early. Delaying your order makes it impossible for the spray manufacturer to keep up with deliveries.

Those who desire to use Sherwin-Williams' dry lime-sulphur for San Jose scale control should use it 16 pounds to 50 gallons of water, which is stronger than recommended at present by the manufacturer.

Miscible oil has been used successfully for San Jose scale control but we do not recommend this in preference to lime-sulphur. When a spray is applied only for brown mite and aphid eggs, when trees are dormant, use miscible oil according to directions on container in preference to lime-sulphur.

Good spraying can not be done with poor equipment. A steady pressure of 250 to 300 pounds is essential for best results and the grower should see that his outfit will maintain this constantly. It is better to have surplus pressure than insufficient, and a safe pressure range is from 250 to 300 pounds for successful work.

The spray rod and spray gun are both used successfully. The man behind the instrument is the determining factor. The clipper nozzle, or a nozzle which will give a similar effect, is desirable for use on the rod. Outfits should be equipped with a tower or step ladder in order to spray most efficiently for codling moth.

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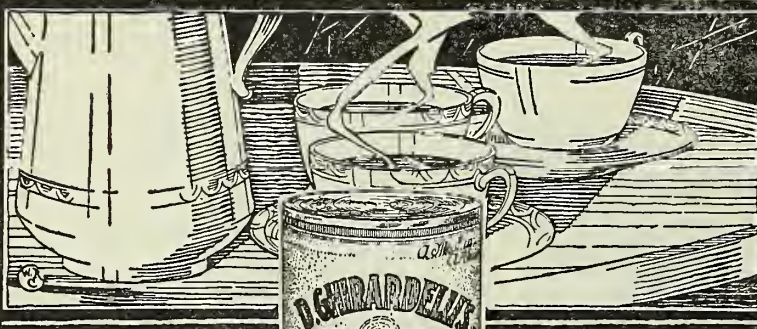
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OUR MARKET-  
THE WORLD



# Don't Send a Penny

The shoes offered here are such wonderful values that we gladly send them, **no money down.** You will find them so well made and so stylish and such big money-saving bargains that you will surely keep them. So don't hesitate—just fill out and mail the coupon and we will send you a pair of your size. No need for you to pay higher prices when you can buy direct from us—and no need sending money in advance before receiving the shoes. Why pay out \$6, \$8 or more for shoes not nearly so good? Act now. Mail the coupon today while this special offer holds good. Pay only when shoes arrive.

## Great Work Shoe Offer

We can't tell you enough about these shoes here. This shoe is built to meet the demand for an outdoor city workers' shoe and for the modern farmer. Send and see for yourself. Built on stylish lace Blucher last. The special tanning process makes the leather proof against acids in milk, manure, soil, gasoline, etc. They outwear three ordinary pair of shoes. Most comfortable work shoe ever made. Very soft and easy on the feet. Made by a special process which leaves all the "life" in the leather and gives it wonderful wear-resisting quality. Double soles and heels. Dirt and waterproof tongue. Heavy chrome leather tops. Just slip them on and see if they are not the most comfortable, most wonderful wearing work shoes you ever wore. Pay only **\$4.29** for shoes on arrival. If after careful examination you don't find them all you expect, send them back and we will refund your money.

**Remarkable  
Bargain**

To order these shoes mark X in the ☐ by number A18027 in coupon. Be sure to give size and width when ordering.

**Send No Money With Order**

## Stylish Dress Shoe

Special bargain to close out a limited stock of these smart Dress Shoes. Act quickly if you want a pair. Made in classy lace Blucher style. Splendid quality calf uppers. Splendid solid leather soles and heels. Come in black only. At our price these shoes challenge all competition. Make your own decision after you examine and try them on. Sent absolutely on approval. You must see them to appreciate the fine quality of material, workmanship and astonishing bargain value. No money with order. Pay only **\$4.69** for shoes on arrival. And that returned if you don't keep the shoes.

Mark X in ☐ by number A15105 in coupon. Be sure to give size wanted.

**Send Coupon**

Keep your money until shoes come. Not a cent to pay now. Sent direct to your home on approval. Then let the shoes themselves convince you of their bargain value or return them and get your money back. This is the modern, sensible way to buy—the way thousands are buying their shoes today direct from us—getting satisfaction—saving money. Fill out the coupon and send it now.

**Leonard-Morton & Co.**  
Dept. 2865 Chicago

**Send  
Coupon  
Today**

**Leonard-Morton & Co.**  
Dept. 2865 Chicago

Send at once the shoes which I have marked X in ☐ below. I will pay price for shoes on arrival with the understanding that if I do not want to keep them I can send them back and you will refund my money.

☐ Work Shoes No. A18027 \$4.29 ☐ Dress Shoes No. A15105 \$4.69

Size.....

Name.....

Address.....